Labofish's

CATECHISM

of

Patents and Inventions,

HOW MADE

A VERITABLE SCHOOL OF SELF-INSTRUCTION IN

PATENTS AND INVENTIONS

WITH QUESTIONS FOR SELF-EXAMINATION

BY

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PRESS OF
HAYWORTH PUBLISHING HOUSE

29 ALLIED PRINTING TRADES UNION LABEL COUNCIL WASHINGTON 29

WASHINGTON, D. C.

PREFACE.

Of all the rights, privileges and opportunities of striving humanity for independent, honest and legitimate acquisition of wealth, the PATENT is universally acknowledged to be the survival of the fittest, and justly so, for there is nothing in which the rich may not superior the poor except in the natural endowments of the mind. Under our present social arrangement, the PATENT is, practically, the only available means whereby any person of ordinary intelligence, whatever his station in life, may easily wrest himself from the very grasp of dependence, poverty and misery, and transpass into independence, comfort and luxury. The PATENT is a royal road to fame and fortune; it is often a most effective remedy for breaking up a spell of hard luck, misfortune or adversity in business, and is more frequently the emancipator of subordination, oppression, drudgery or loathsome toil. These are undeniable facts; they are of very fre-

quent occurrence in every state, town and hamlet.

The gates are wide open, the work is entertaining, skill is easily acquired, the demand for inventions is unlimited, and the reward offered is most tempting. But the path over which the inventor must travel to reach the goal, like every other road to fame and fortune, is rough and rugged and beset with impediments, of which precious few of the aspirants and even veterans are aware. Hence, thousands of impromptuists and guileless stumble and go down into the depth of failure and disappointment.

Years of incessant application, assiduous, deep and reflective meditation, and practical experience with patents and inventions, delving into the very root of the art, science and practice of patents and inventions, yearning for a ray of success, led the author of this work to the conclusion that success with patents is concurrent with the amount of knowledge of the underlying legal and commercial principles governing patents and inventions possessed by the inventor. An inventor having little or no knowledge of the spirit of our patent laws, depending entirely upon his patent attorney for the proper preparation and prosecution of his application before the Patent Office, does not generally get the patent he is entitled to; hence, a fail-

ure. An inventor devoid of a thorough knowledge of the laws of patentability of invention and discovery is often the sole owner of a worthless patent; hence a dire failure. An inventor devoid of a practical working knowledge of science and mechanics produces crude and impractical inventions; hence, a commercial failure. An inventor lacking in an understanding of the principles governing patents and inventions is readily attracted by the flaring advertisements of professional *patent-makers* and becomes the *sole owner* of a *guaranteed patent* for the full term of seventeen years; hence, a long, lasting and humiliating failure.

A merchant or professional man buying a farm and employing a foreman to manage it for him, himself having no knowledge of farming, is an absolute failure. A person undertaking any enterprise without a previous training therefor, is a certain failure. Why should not an inventor? He is to acquire and maintain a deed to a valuable piece of property that has no other existence but in law. Should not a knowledge of the spirit of the patent law be as much a part of his stock-in-trade as the knowledge of reducing an invention to a practical form? Ninety-five per cent. of merchants plunging into business without a previous training therefor meet with a disastrous

end. Is it a wonder that thousands, or perhaps tens of thousands, of inventors never realize from their inventions even so much as to defray the cost of the patent?

Nothing but a thorough understanding of the leading underlying legal and commercial principles governing patents and inventions will insure success with patents. Having arrived at this conclusion, I found myself possessed of a burning desire to present to my brother inventors the means of acquiring such knowledge in the best and most practical manner and within as short a time as possible. Accordingly I have, after a long, serious, and profound investigation, years of practical experience with patents and inventions and deep analytical study of patent law and patent procedure, prepared and published the present condensed and comprehensive volume, the aim and purpose of which is:

1. To instruct in the leading underlying principles of the United States patent laws in patent causes;

2. To instruct in the leading underlying legal, commercial and mechanical principles, and to furnish the most valuable truths in reference to the nature, object and value of a United States patent;

3. To convey to the minds of inquirers, information that will enable them to avoid the terrible disappointments and the enormous losses of time, money and energy to which the unwary are constantly exposed;

4. To furnish clear and explicit practical instructions on how to acquire a practical working knowledge of science and mechanics, how to invent and what to invent; also, clear, explicit and practical instructions on how to reduce an invention to a practical and patentable form, and how to protect an invention against possible complications;

5. To furnish practical instructions, information and advice in reference to the best, most economical and profitable method of disposing of patents, etc.

In its detail arrangement it is a question-and-answer instruction book and is provided with a long list of questions for self-examination; A VERITABLE SCHOOL FOR SELF INSTRUCTION IN PATENTS AND INVENTIONS AND IN PATENT PROCEDURE. It explains in simple language, in a most natural style and peculiar system, important legal phraseology and presents a large range of topics indispensable to both experienced and inexperienced inventors and patentees, and lawyers, business men and mechanics

that are, or may in any way become, interested in patents or inventions. Every important question of law is carefully interpreted and explained in a clear, concise and popular way so that readers of ordinary intelligence may comprehend and utilize. The book further explains to the inventor and to the lawyer the relative bearings of the law on all classes of inventions and discoveries, and broadens his understanding of the spirit of those laws. The momentous subjects are copiously illustrated therein by examples, and for the purpose of enabling the student to distinguish between a broad and a narrow, a real and a false claim, models of claims are shown and explained in such a manner as to leave a lasting impression upon the student's mind. It further aims to impress upon the student's mind the important principles and essential requirements in the preparation of a specification and claims as well as the importance of exercising great care and accuracy in the execution of the work, the lack of which resulted in the loss of countless valuable inventions to their inventors. It also embraces a volume of practical instruction, information and advice of inestimable value to every intelligent person whose financial condition may be bettered by the use of his or her mental powers.

Thus, upon the knowledge which is freely and

fully imparted by this comprehensive catechism depends not only the procuring of such a patent as would secure to the inventor the exclusive right to his invention, but the maintaining of such a right to the end of the term for which the patent is granted, as well as the intelligent production of commercially practical inventions and the successful attainment of the financial end of the patent. This book should therefore be studied with due care and its contents riveted into the student's mind by means of the questions for self-examination.

Posing throughout the book, in the capacity of tutor, it becomes necessary for me, in order to explain matters intelligently, to make frequent use of the personal pronoun and to address the reader as student in order to impress the subject upon his mind. This liberty it is hoped will, in view of the expediency, be overlooked.

In the preparation of this work the "catechetical" was deemed the most effective form, as by this means a comprehensive treatise embodying practically the entire subject of PATENTS and INVENTIONS could be embraced within reasonable limits; also because this is the most rational way of intelligently answering a large number of important questions without swelling the book and be-

cause this simple method assures the absorption of a larger part of the subject-matter by the busy, the superficial and the disinclined student than would an attempt to sift the same knowledge from a large number of bulky text books.

No attempt has been made to introduce an extensive history of patents and inventions, of no earthly use in the comprehension of the subject; or a list of dry and tasteless court decisions, or a code of laws and citations, to which the average reader would have no access. Nor was any attempt made to introduce anything that would be of no especial benefit to the non-collegian but what is of benefit to the lawyer and laymen, professor and mechanic, business man and farmer, that all may be benefited and benefit mankind—the sole aim of our patent laws.

This is all the author attempted to accomplish, and how well this has been done will depend upon the good judgment of others.

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QUESTIONS FOR SELF-EXAMINATION.

After a thorough study of the entire book, answer mentally the following questions referring to the numerals for verification:

INTRODUCTORY.

[1] How was the inventive faculty of the human mind discovered?

[2] What led up to the adoption of the PATENT?

[3] Why is the patent the greatest reward?

[4] Does the patent stimulate inventors to action?

[5] Does the reward of the patent accomplish its purpose?

[6] Where and how did the patent laws originate?

[7] Did we have patents granted before the adoption of the Constitution?

[8] When was the patent system established in this country?

[9] When was the Patent Office reorganized?

[10] What and when were other changes in the patent system made?

[11] What tends to show that our patent system came from the English statute?

[12] In what respect does our patent system differ from others?

[13] Define the policy of our patent laws.

[14] State the reasons why we have adopted such policy.

[15] Can our laws protect our inventions abroad?

CATECHISM.

1. [1] What is a patent?

[2] What does the patent grant?

[3] What if the inventor is unable to make or market his invention?

2. [1] Why should the Government grant to the inventor such an exclusive right?

[2] When was the first patent act enacted?

[3] What are the conditions of the contract between the Government and the inventor?

3. [1] How does a patent differ from a monopoly?

[2] How is the community benefited by the encouragement of genius?

4. [1] How does the law secure the exclusive right of his invention to the inventor?

[2] To what extent is infringement punishable?

[3] How is a design patent infringed upon?

[4] What other act is within the purview of the patent law infringement?

[5] What is the punishment for infringing upon a design patent?

[6] For whose benefit are the damages recovered?

[7] What if the infringer was caught in the act before he made anything out of his infringement?

5. [1] Why do infringers invade upon the patentee's rights?

[2] What will curtail the numbers of infringement suits?

[3] What effect have poor patents upon inventors and patentees?

6. What is the judicial definition of the words "invention or discovery?"

7. What is the legal purport of the words "any person"?

8. Of how many kinds is invention or discovery?

9. What is the legal purport of the word "any"?

10. What is the legal purport of the word "new"?

11. [1] What is the legal purport of the words "not known or used by others"?
    [2] By how many does the invention have to be known or used to render it unpatentable?

12. Does the knowledge of the invention in a foreign country bar a patent in the United States?

13. Of two or more simultaneous inventors, which one of them is the first?

14. What is an abandoned experiment?

15. How is an invention reduced to practice?

16. How useful must an invention be to be patentable?

17. [1] Define the legal term "art".
    [2] What is a process?
    [3] Name the different kinds of patents the United States Patent Office is issuing and for what inventions.

18. What is the legal purport of the word "machine"?

19. What is the legal purport of the word "manufacture"?

20. What is the legal purport of the words "composition of matter"?

21. [1] What is the legal purport of the word "improvement"?

    [2] What does the word "improvement" embrace?

22. Does an improved machine have to be composed of parts different from those of the old machine?

23. How can an inventor control the invention of a new art, principle, discovery, effect, function or motive power?

24. What changes in the form of an article are patentable?

25. Why are curves or angles patentable?

26. How is the assembling of two or more articles into a unitary structure rendered patentable?

27. How are airships or perpetual motion machines patentable?

28. [1] What is the legal purport of the words "principle of a machine"?

[2] Why is a new principle for an old machine a good invention?

[3] Why should not the discovery of a new art, principle, process, effect or function be patentable?

[4] How is the discovery of a new natural substance patentable?

[5] Why is such not patentable?

[6] Why are patents for old elements sustained by the Courts of Justice?

[7] Why are equivalents not patentable?

[8] When is an invention that accomplishes no new and useful purpose patentable?

[9] When is the application of an old and well-known purpose patentable?

[10] Is embellishment patentable?

29. Name the fundamental requirements of an application for a patent.

30. How should an invention be shown and described?

31. State the reason why the law demands a concrete and illustrative application.

32. How do defective specifications escape the examiner's notice?

33. What is a claim?

34. What is a patent established upon?
35. Name the different parts of a complete application for a patent.
36. [1] What is the legal criterion for ambiguity in patent causes?
    [2] Why should the law restrict the inventor to such absolute accuracy?
    [3] How full and clear should the specification be?
    [4] What is the legal criterion for mechanical skill?
    [5] Is it necessary to disclose the entire secret?
    [6] How should improvements be described?
37. In what instances does the Patent Office call for a model?
38. What are the drawings to a patent?
39. Why does the Patent Office require such artistic drawings?
40. What is a patent attorney?
41. Who employs the patent attorney?
42. Can the power of attorney be revoked?
43. How is the power of attorney revoked?
44. Who makes the patents?

45. [1] What assistance or advice does the Patent Office offer the inventor in the way of selecting a competent man?

[2] Are there many incompetent patent attorneys?

[3] Why does the law allow such attorneys to practice before the Patent Office? A. For the same reason that it does bogus doctors, professors, healers, curers, hypnotizers, magnetizers and all sorts of fakes and fakers, who are slick enough to evade the criminal law, to impose upon the people.

46. What remedy has the inventor if the attorney turns out a defective patent?

47. What is the administration of the Patent Office?

48. How is an application examined?

49. What claims are generally rejected?

50. Why should patents have broad and narrow claims?

51. Why strive to secure broad claims?

52. How broad should claims be?

53. Will the Patent Office allow very broad claims?

54. What is a broad claim?
55. Do claims rejected by the examiner remain rejected?
56. What is meant by the words "state of the art"?
57. How should claims be amended?
58. Does the examiner cite new references at every action?
59. How does an incompetent patent attorney amend a case?
60. Why should not the Patent Office see to it that the attorney makes proper claims?
61. Whose duty is it to look after the inventor's interest?
62. In matters of contention between the examiner and the attorney, who is entitled to the benefit of the doubt?
63. What remedy does the law provide to settle differences of opinion in the office?
64. What is a combination claim?
65. Do the elements of the old structure become the patentee's invention?
66. Of what importance is a combination claim?

67. To what extent is the patentee benefited by embodying the elements of the old article?
68. Does the Patent Office issue patents upon unexpired patents?
69. Does an improver on a patented machine acquire a right in the patented machine?
70. Is it feasible to improve upon a patented article?
71. What is a generic claim?
72. Is it necessary to express equivalents?
73. Why should the invention described in the specification be repeated in the claims?
74. Does it ever happen that an attorney claims more than his client is justly entitled to?
75. Can the inventor hold such claims?
76. When should disclaimer be made?
77. What is an infringement?
78. Where should action against an infringer be brought?
79. How is a patent infringed upon?
80. What is an interference?
81. What are the proceedings in interference cases?

82. Upon which of these parties does the burden of proof rest?
83. What is an abandoned application?
84. Can an abandoned application be renewed?
85. What is a forfeited application?
86. Can a forfeited application be renewed?
87. Does an application for renewal require a new specification?
88. In what instances would an inventor file a declaration of abandonment of his pending application?
89. Is inventing a profitable occupation?
90. What makes small and simple inventions profitable?
91. Why take a simple invention for an example?
92. How is a two-cent royalty invention profitable?
93. Does every inventor make such an immense fortune out of a simple idea?
94. Why do they not?
95. What should the pan-handle inventor have done?
96. How broad should the claims for the pan-handle have been made?

97. How should the pan-handle claims have been worded, commensurate with the inventor's conception of a cool pan-handle?
98. What do these claims secure to the inventor?
99. Does every invention have a future possibility and several phases?
100. How can future possibilities of an invention be provided for?
101. Can two or more persons make an invention?
102. Can two or more independent inventors join in one patent?
103. If one furnishes the money for the patent, can he join the inventor in the patent?
104. What are the prescribed conditions?
105. What is an assignment?
106. What is a State, shop, or county license?
107. What is a reissued patent?
108. What is a design patent?
109. What is a caveat?
110. Who may file a caveat?

INTRODUCTORY.

*[1] The innumerable inventions and discoveries since the discovery of the tree of knowledge in the Garden of Eden, particularly the wonderful arts of the ancients, the sciences of geology and mathematics, the discovery of the telescope, and the galvanic circuit, gave unmistakable evidence of the existence of a powerful inventive faculty in the human mind. But, no appreciable attempt has been made to explore this faculty until the innovation of the art of printing from movable type. When literature became more abundant and reached the masses, then men began to think for themselves, and crave for more knowledge, art and science, and clamor for the exploitation of that wonderful faculty whence it comes. [2] To exploit the great possibilities of the human mind, in order to promote the progress of science and the useful arts, some suitable reward commensurate with the scope of every achievement had to be devised. This led to the

* Numerals refer to the questions for self-examination.

adoption of the "PATENT," which is now universally acknowledged to be the highest reward possible concurrent with every invention.

[3] The incentive afforded by the patent appeals to two of the most widely-felt springs of human action—the love of reward and the pride of possession. Indeed, nothing else would have accomplished so well the desired result as that of the patent. The love of reward is active, is instinctively felt, and is constantly present in the human breast. The instinctive love of ownership is active not only in the man, but in the breast of every beast or bird; in fact, of every living being. A man will take the most desperate chances to repossess himself of dispossessed property; he is always ready to protect his property with his life, and watches over his possessions more ardently than over anything else dear to him. It is thus easily understood how the patent, which satisfied these human instincts, is the most powerful incentive to the exercise of man's inventive genius. [4] Throughout all civilized countries, inventors labor constantly and zealously in view of the reward which they hope to reap through the ownership of their inventions, vested in them by the grant of the pat-

ent, [5] and as a consequence science and art are striding with wonderful rapidity, their attainments are beyond all expectation, and their future most promising.

THE ORIGIN OF THE PATENT LAW.

[6] The origin of the patent law is generally supposed to be the English statute of James I. (1623), which in terms destroyed all monopolies, but allowed the crown to grant to inventors patents for their new inventions and new processes of manufacture. This is considered the origin of the patent law, because up to that time the obtaining of a patent had not been a matter of right, but a mere matter of grace on the part of the crown. By the statute of James I., the law stepped in and regulated the matter. It gave the inventor the right to obtain a patent, and thus converted the system from a mere arbitrary reward for past merit to a promise of protection, and this promise was held out to inventors only. Thus the laws of monopolies were changed to an incentive to obtain the reward for the invention or discovery of something beneficial to the community. That statute of James I. did

not declare, and no English statute has since declared, in terms the absolute right of the inventor to have a patent, as ours does. In language the statute leaves it, at least until recently, as a grace from the crown; but, according to the English theory of government, the regulation of the right by Parliament practically requires the sovereign to grant the patent when the inventor has complied with the necessary formalities.

[7] In this country the English patent system was known before the adoption of the Constitution, and the different States had repeatedly and to a considerable extent granted patents for inventions. This practice of the various states was mentioned and a number of illustrations of it is given in certain Patent Office Reports; it was referred to also in one of our earliest statutes, in which Congress enacted that no one should have the benefit of that patent law unless he first surrendered the patent which he obtained under the state authority.

[8] The patent system in this country was practically established in 1787, but not until April 10, 1790, did Congress enact the first patent act, entitled: "An act to promote the progress of the useful arts." This act was amended in 1793, and

again in 1800, and, with some minor amendments of detail, which did not essentially change its character, it remained until 1836. [9] At that time the Patent Office building wtih all its contents was destroyed by fire, and that disaster led to the revision of the existing statutory system and the reorganization of the Patent Office. The act of 1836 created the present Patent Office and put a Commissioner of Patents at the head of it, charging him with the duty of examining all applications for patents in order to ascertain their novelty and utility. Previous to that the Secretary of State and the Attorney-General were examining inventions and determined whether they were patented or not. Under the act of 1790, a patent was made *prima facie* evidence; that act was repealed by the act of 1793, and that provision was not reenacted in it. Hence, a patent was not received in courts of justice as even *prima facie* evidence that the invention patented was new and useful, but the plaintiff was bound to prove these facts in order to make out his case. But the act of 1836 introduced a new system, and under its inquisition and examination a patent was received as *prima facie* evidence of the truth of the facts stated therein.

The patent system established in 1836 has existed in this country ever since, and it does not exist, to any practical and useful extent, in any other country. [10] In 1860 the term of the patent was changed from fourteen years to seventeen years, and the power of the Commissioner to grant an extension for seven years was taken away. The laws were again revised in 1870, but with those exceptions they have continued substantially as before, with the exception of the proceedings in the Patent Office, which have been and are quite frequently changed in some particulars. [11] The fact that our patent laws originally granted patents for the term of fourteen years, is pretty conclusive proof that our patent system came from the English statute; for the statute of James I. provides fourteen years as the life of a patent, and under or subsequent to that statute the practice grew up of extending our patents for seven years more. From the fact that the term for which the patent existed by our first law was fourteen years, it is obvious that our law makers had before them, and had in mind, the English patent system.

Patents are now a universal custom with enlightened communities; however, the difference between

our laws and those of other countries is marked and distinct. [12] The great distinguishing feature of the patent system of this country, as previously stated, is, that it requires all applications for patents to be subjected to a preliminary examination, as to originality and novelty of invention, before a patent can issue. It further forbids the issue of a patent to anyone who is not the first as well as the original inventor of the thing sought to be patented. Though the practical operation of such a system is necessarily attended with difficulties, it can scarcely be questioned that it is highly useful. In bringing to the inventor's notice what is already known in the art to which his invention appertains, many annoying complications are avoided.

In England and in most other countries, patents were considered by the courts as monopolies, odious in the eye of the law, and were construed strictly. In this country, however, it has been uniformly held that the design of our patent laws was to encourage genius in advancing the arts, by protecting their productions, and that such laws were

to be construed favorably because they are beneficial to the community, and that patents were rewards to ingenious persons for the advantages derived by the public from their exertions.

THE POLICY OF OUR PATENT LAWS.

Many of the provisions of our patent acts are, as stated, derived from the principles and practice which have prevailed in England. And though the known and settled construction of the English statute of Monopolies, by their courts of law, has not been received by our courts with all the weight of authority, yet the construction of that statute by the English courts, and the principles and practices which have regulated the grants of the English patents, afford material to illustrate our statute. [13] The settled purpose of the United States has ever been to confer to the inventors of useful inventions an exclusive right to their inventions for the time mentioned in their patent. It is the reward stipulated for the advantages derived by the public from the exertions of the individuals, and is intended as a stimulus to those exertions. The great object and intention of the patent act is, however, to secure to the public the advantages derived

from the individual discoveries, and the means it employs are the compensation for the time and labor devoted to these discoveries, by the exclusive right to make, use and sell the thing discovered, for a limited time.

[14] The Constitution of the United States, in giving authority to Congress to grant patents for a limited period, declares the object to be to promote the progress of science and the useful arts; an object as truly national and meritorious and well founded in public policy as any that can be within the scope of national protection. Hence, it has always been the course of the American courts—and latterly of the English—to construe patents fairly and liberally, and not subject them to overnice and critical refinements. The patent law gives to inventors a monopoly, but not in an odious sense. It takes nothing from the community at large, but secures to them the greatest benefits. To secure to inventors the remuneration for their time, ingenuity and expense, a liberal construction should be given to the law. The patent laws are not made to encourage monopolies of what before belonged to others, or to the public—which is the true idea of a monopoly—but the design to encour-

age genius in advancing the arts through science and ingenuity, by protecting its productions of what did not before exist and of what never belonged to another person, or the public. The patent acts have been passed for the promotion of the useful arts—for the ultimate benefit of the public, and not for the sole benefit of inventors and patentees. It is for the ultimate benefit of the public that privileges are granted to inventors and allowed to operate, and are protected for limited times for their direct benefits.

[15] The power granted by the patent laws is domestic in its character, and necessarily confined within the limits of the United States. The patents do not and were not intended to operate beyond the limits of the United States and the patentee's right of property and its exclusive use can not extend beyond the limits to which the law is confined.

PART I.

1. Q. What is a patent?

A. [1] A patent, for an invention, is a Government grant to the inventor, securing to him and to his heirs, for a term of seventeen years, [2] the exclusive privilege of making, using or vending his invention throughout the United States and the territories thereof; [3] or of authorizing others to make, use or vend any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, of his invention.

2. Q. Why should the Government grant the inventor such an exclusive right?

A. The PATENT is the result of a certain bargain between the Government of the United States and the inventor, and is founded on the following business transaction:

[1] In 1787, the framers of the Constitution of the United States embodied in the Constitution the following clause: Art. 1, Sec. 8: "The Congress shall have the power to promote the progress of science and the useful arts by SECURING for

LIMITED TIMES to authors and inventors the EXCLUSIVE right to their respective writings and discoveries." Every person has a natural, legal and moral right to his own writings and discoveries for an unlimited time, but what would prevent one from invading on an author's or an inventor's right? Here the Constitution held out an offer of protection "BY SECURING" in consideration of the "LIMITED TIME." This clause in the Constitution is strictly a business proposition, and the patent is thus a bilateral contract between the Government and the inventor, pure and simple.

[2] In 1790, at the first session, Congress promulgated the first patent act, entitled "An act to promote the progress of the useful arts," in which it laid down the terms and conditions of the contract the Government is willing to make with the inventor for the purpose of promoting the useful arts. The terms and conditions of that act are, in substance, as follows: [3] If you, Mr. Inventor, will describe the details of your invention, which you say is something that has never before existed, "clearly, truly and fully," I, the Government of the United States, will "thereupon" see to it that no other person shall, for a limited time, make, use or sell a

machine like yours. The benefit of this business transaction is mutual; the Government is thereby benefited to the extent of promoting the useful arts, and by the latter free use of the invention by the public, and the inventor to the extent of having absolute control of the market for his machine for a limited time. Having no competition, he is able to command a good price for his machine or thing patented.

3. Q. Is not that exclusive right conferred by the patent a monopoly?

A. No; not in the true sense of the word, though our modern patent system grew out of the ancient system of monopolies. A patent is entirely different in its nature and effect from a monopoly. The granting of monopolies, or exclusive privileges of selling certain articles of commerce, originated in the infancy of European commerce when ventures were attended with great risk of both life and capital. The seas in those days were swarming with pirates, and the land with robbers; the exclusive privilge of vending such articles were granted to those persons who braved, or were supposed to have braved, such dangers, [2] exclusive of those who might have obtained such articles in like or different

manner. The exclusive privilege granted to the inventor by the patent, as shown, was awarded by the Constitution of the United States for the purpose of encouragement of arts and science, and not as a restriction upon the rights of the community, since the invention has never belonged to it.

The encouragement thus tendered to our inventors by the foregoing Constitutional provision and act of Congress had a remarkably stimulating effect upon our people. [2] Our inventors have made us the most envied nation on earth. "Yankee ingenuity" is now proverbial throughout the world; its products envelop the globe; its blessings are felt by every beating heart. Inventions reduced the hours of drudgery to one-half, and more time for thought, reflection and recreation is thus afforded.

4. Q. How does the law secure to the inventor that exclusive right to make, use and vend his invention, conferred by the patent?

A. For the purpose of securing to the inventor the exclusive right to his invention, conferred by the patent, [1] Congress enacted certain laws which provide for the punishment of the infringer and for the recompense of the patentee. The law prescribes that damages for the infringement of any patent

may be recovered by action on the case in the name of the party interested either as patentee, assignee, or grantee. And that whenever in any such action a verdict is rendered for the plaintiff, the court may enter judgment thereon for any sum above the amount found by the verdict as the actual damages sustained, according to the circumstances of the case, [2] not exceeding *three times* the amount of such verdict, together with the costs. Thus, if the infringer has not made anything of the infraction, but by making or using the patented article he caused the patentee to suffer loss to the extent of $1,000, the infringer must pay to the patentee $3,000 and the cost of the suit for the infraction brought against him. This is a very effective remedy; for no sane person would imitate a patented article in view of such a law and subject himself to such severe punishment as is sure to be his lot if he is sued by the patentee.

In case of a design patent, the law prescribes that during the term of Letters Patent for a design it is unlawful for any person other than the owner of said Letters Patent, without the license of such owner, [3] to apply the design secured by such patent, or any colorable imitation thereof, to any article of

manufacture for the purpose of sale, or to sell [4] or expose for sale any article of manufacture to which the design or colorable imitation has, without the license of the owner, been applied, knowing that the same has been so applied. And that any person violating the provisions, or either of them, of that section of the law, is liable in the amount of [5] *two hundred and fifty dollars;* and in case the total profit made by him from the manufacture or sale, as aforesaid, of the article or articles to which the design, or colorable imitation thereof, has been applied, exceeds the sum of two hundred and fifty dollars, he is further liable for the excess of such profit over and above the sum of two hundred and fifty dollars; and the full amount of such liability may be recovered by the owner of the Letters Patent, [6] *to his own use,* in any circuit court of the United States having jurisdiction of the parties, either by action at law or upon a bill in equity or an injunction to restrain such infringement; and that nothing in this act should prevent, lessen, impeach, or avoid any remedy at law or in equity which any owner of Letters Patent for a design, aggrieved by the infringement of the same, might have had if such act had not been passed; but such owner shall

not twice recover the profit made from the infringement. Thus, the infringer, or imitator, of a design patent has to pay the patentee the sum of $250 even if he has [7] never made a dollar out of his imitation. These laws are very effective and the patentee's rights are perfectly protected by law.

5. Q. But we do hear of infringement suits most every day; and almost every patent that is issued is infringed upon, or there would not be so many infringement suits. How, then, do these laws effectually prevent infraction?

A. The numerous infringement suits that we hear of so often, are seldom, if ever, the cause of actual infringement upon an invention that is properly covered by a patent. When an invention is distinctly and clearly defined in the specification, properly presented and carefully claimed, no one will attempt to infringe upon that patent. But an open door courts a thief, says an old saw. [1] Where there is a weak patent, someone is sure to take advantage of it. Most of the infringement suits and litigation of patents arise from defective titles, insufficient or improper claims, ambiguous or otherwise defective specifications, etc.—not from making an article that is properly covered by a patent.

It is the main object of this book to enlighten inventors on the subject of patents. [2] A clear comprehension of the letter and spirit of our patent laws and of what a patent really is and what it should be will result in real patents and banish infringement suits; such contests will diminish in proportion to that knowledge, and patents for inventions, large and small, will rise in value and importance. Thousands of nebulous patents are issued yearly and most every one of those patents is defeated in the courts; patentees who purchase such lose a great deal of money, and inventors who have [3] real patents have the greatest difficulty to dispose of them. Nebulous patents are perfectly worthless and unsalable at any price; one who happens to buy such a patent once will never buy another patent of any kind. The subject of infringement—what it is and how it arises and how to prevent it—will be treated in this volume more extensively after the student has become more familiar with the laws on patents and inventions, and the essentials of specifications and claims, which will be clearly defined in the succeeding pages in this work.

6. Q. What is an invention? What is a dis-

covery? Who may obtain a patent for such invention or discovery?

A. Section 4886, of the United States Patent Laws, prescribes that any person who has invented *or* discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, not known or used by others, may obtain a patent therefor. Section 4887 prescribes that no person shall be disbarred from receiving a patent for his invention *or* discovery. The Constitutional provision for patent protection, upon which the aforementioned sections were enacted, makes no mention of invention, but of discovery (see answer to question 2), yet, in practice, the discovery of a new art, machine, manufacture, or composition of matter is not the subject of a patent.

The accepted legal definition of the term "invention," as gathered from decisions rendered by judicial tribunals, is the act of devising a machine or mechanical contrivance to perform a certain function to the end of attaining a useful result; and "discovery," the act of finding out a process or method which through the medium of some artificial means a result is attained. Thus, though dis-

covery is not by itself patentable it is patentable under the means through the medium of which the result is attained.

7. Q. What is the legal purport of the words "any person"?

A. The adjective "any" excludes every possible distinction as to race, color, nationality or age; thus *any* man or woman, boy or girl, citizen or alien who has made an invention or discovery may obtain a patent therefor.

8. Q. Of how many kinds is invention or discovery?

A. Invention or discovery is of two kinds; first, any article or thing that has never before existed; second, any article or thing that is now in common use, or has been in existence, but is improved.

9. Q. What is the legal purport of the word "any"?

A. the adjective "any" renders the meaning of the law very comprehensive. "Any" admits of no exception. "Any" thing that is new and useful.

10. Q. What is the legal purport of the word "new"?

A. By the word "new " is meant an article or a thing or an improvement in such article or thing, so new that it has not been known or used by others in this country before the inventor's invention or discovery thereof, or patented or described in any printed publication in this or any foreign country before the inventor's invention or discovery thereof.

11. Q. What is the legal purport of the words "not known or used by others before the inventor's invention or discovery thereof"?

A. Under the patent laws of the United States, the applicant for a patent must be the first as well as the original inventor. A subsequent inventor, though an original inventor, is not entitled to a patent. The words "by others" do not denote plurality, for it is of no consequence whether the invention is extensively known or used, or whether the knowledge or use thereof is limited to a few persons, or even to the first inventor himself; the first inventor alone is entitled to a patent.

12. Q. Would an invention that has been known or used in a foreign country be patentable in the United States?

A. Yes; but, in the words of the law, only "if it appear that the inventor, at the time of making his application, believed himself to be the first inventor or discoverer, a patent will not be refused on account of the invention or discovery, or any part thereof, having been known or used in any foreign country before his invention or discovery thereof, if it had not been before patented or described in any printed publication."

13. Q. Of two inventors who have conceived an idea at approximately the same time, which one of them is the first inventor?

A. An imperfect or incomplete invention, whether founded on mere theory, or on vague notion, or on uncertain experiments, but not actually reduced to practice, or embodied in some distinct machinery, apparatus, or manufacture, is not, under our patent laws, an invention. Hence, he is the first inventor, in the sense of the law, who has first perfected and adapted to use something reduced to practice, or embodied in some distinct machinery, apparatus, or manufacture, and is alone entitled to the patent therefor.

14. Q. As the law demands that the invention,

for which a patent is solicited, shall not have been previously known or used by others, would the patent granted to the second inventor, who first reduced the invention to practice and whose invention has thus been known to the first invetor, be valid?

A. Under the patent laws of the United States, the knowledge of the invention by one or more persons who have abandoned the experiment does not bar a patent to a diligent inventor who perfected the abandoned invention. In other words, an inventor who has first actually perfected an invention will not be deemed to have surreptitiously or unjustly obtained a patent for that which was, in fact, invented by another; *unless* the latter was, at the time, using reasonable diligence in adapting and perfecting the same. It is a rule of law that he who invents first shall have the prior right *if he is using reasonable diligence* in reducing his invention to practice, although the second inventor has, in fact, first perfected the invention and first reduced the same to practice in a positive form.

I was recently consulted by an inventor, who is a fireman on a locomotive; the man obtained a patent for an improvement in an oil-can which is now

being made and marketed on a royalty. The inventor exhibited letters from a certain oil-can manufacturer in which he claims that some six or seven years ago his son conceived the idea of making an oil-can like the one patented by the fireman, and that he had then made an imperfect model showing certain features of the patented oil-can, but was so busy since that he could not spare the time to perfect it. The manufacturer wished the inventor to call on him and *talk it over* with him. No doubt many an honest original inventor is threatened in a similar manner. Such cases have been tried again and again and declared to be abandoned experiments; that oil-can manufacturer's son has absolutely no claim to the patented oil-can. Thomas A. Edison was not the first inventor of the incandescent electric light, nor was Prof. Alexander G. Bell the first inventor of the telephone, neither is William Marconi the first inventor of the wireless telegraph; these were all abandoned experiments and these gentlemen have only perfected them and reduced them to practice. The law considers reduction to practice actual inventing, although the last inventor added but a spring or a screw or some other insignificant part, but, if by this means he

made the thing work or available for practical use, he is entitled to a patent for the whole machine or thing.

15. Q. What is the legal purport of the words "reduction to practice"?

A. By the words "reduction to practice" is primarily meant the actual building of a working machine embodying the invention; but the Patent Office holds that the filing of an application for a patent is a constructive reduction to practice, it being an announcement to the world and a notice to the Government that the applicant has perfected the machine and that it is now ready for practical use and that the applicant is entitled to a patent therefor. The requirement of an actually constructed machine or model was abandoned by the Patent Office on the ground that from a properly constructed specification and drawing, such as the law requires, a mechanic skilled in the art to which the invention appertains would be able to construct the machine without making further experiments of his own, except, of course, to ascertain the proper materials, dimensions and proportions, in which the law is not concerned.

16. Q. What is the legal purport of the word "useful"?

A. In the patent act of the United States, the word "useful" means an invention that may be applied in a beneficial manner, in contradistinction to an invention that is injurious to public health or morals, or is pernicious, frivolous, or worthless. The Patent Office is not concerned in the degree of utility of inventions, but want of utility is good cause for not granting a patent; the invention must be of some use but not necessarily superior to the old article or thing.

17. Q. What is the legal purport of the word "art"?

A. The radical meaning of the word "art" seems to afford subject-matter for discussion. The Constitutional provision, under which our patent laws are framed, looks to the promotion of "useful arts" (see answer to question 2). The act of Congress places "a new and useful art" among the inventions and discoveries it professes to protect, and assigns to it the first place in the list (see answer to question 7.) Yet, an art such as that is, in the abstract or the principle only, can not,

under the patent laws, be made the subject of a patent, but must be explained in the specification and illustrated in the drawing when of such a character as to render this possible. An art, in law, means a [1] useful art, which to procure a patent therefor must be described with exactness in its mode of operation, and can be protected only in its mode of operation. It must be explicable and referable to something that may prove it to be useful.

[2] A process is included under the general term "useful art", as an art may require one or more processes or machines in order to produce a certain result or manufacture; as the art of photo-engraving requires several processes in the operation. A process is usually the result of discovery; a machine, of invention. One may discover an improvement in a process irrespective of any form of machinery, and another may invent a labor-saving machine, by which the operation or process may be performed better or cheaper, and each may be entitled to a patent.

[3] Patents for arts are of two kinds—design and construction; the former are granted for improvements in the esthetic, or fine arts, such as ornamentation, configuration, etc., and the latter for

improvements in the useful arts of industry and mechanics, such as construction and arrangement.

18. Q. What is the legal purport of the word "machine"?

A. The term "machine" includes every mechanical device or combination of mechanical powers and devices to perform some function or to produce a certain effect or result; it is of no consequence whether same is made of metal, wood, or other substance. In the statute the word "machine" includes new combinations as well as new organizations of mechanism. An "improved machine" and "an improvement in a machine" are substantially the same.

19. Q. What is the legal purport of the word "manufacture"?

A. The word "manufacture" embraces practically everything that is not a machine, art or composition of matter; as a hair-pin, a clothes-pin, an envelope, a shoe, a garment, a corset—in fact, everything that is made by hand or machinery, but not what is produced by nature, as a tree, a flower, or vegetable.

20. Q. What is the legal purport of the words "composition of matter"?

A. Matter that is composed of two or more ingredients, whether it is in liquid, paste, pill or tablet form, such as shoe blacking, stove polish, medical or chemical compositions, etc. Medical compositions, however, are discriminated against by the Patent Office, probably because of their indiscriminate use and therefore unwholesome effect upon the public health

21. Q. What is the legal purport of the word "improvement"?

A. By the word "improvement" is meant, any specific article or thing (art, machine, manufacture or composition of matter) which now exists, but that by adding something to its present structure or by taking something from its present number of parts, without decreasing its efficiency, or by rearranging its component parts, some new and desirable result is obtained, such as an enlargement upon the scope of operation of such article, the simplification of operation or manipulation of such article, or the reduction of the cost of its manufacture, or some equivalent of these. Within the

meaning of the word "improvement" every change of construction of an article, however slight it may appear, if the change conserves some useful purpose it is understood to be an improvement and patentable.

22. Q. Does an improved machine, to be patentable, have to be composed of parts different from the old machine?

A. No; all the parts may be old and well known. The material question in patent causes is not whether the same elements of motion or the same component parts are used; but whether the given effect is produced substantially the same as in the old machine; by the same mode of operation and by the same combination of powers. The very same old parts may be used in the same machine, but if in a different combination the machine is patentable. For instance, the cranks and pedals of a bicycle were formerly used to turn the front wheel of the machine; the change of position of these very cranks so as to turn the back wheel instead of the front produced a new and patentable machine; this change in the position of the cranks made safety, high speed, low drop and short turn possible—objects heretofore unattainable.

23. Q. Is a new discovery, a new effect, a new function, a new principle, or a new motive power patentable?

A. A patent can in no wise be for an abstract discovery, effect, function, principle, or motive power unless the inventor or the discoverer has gone beyond the mere domain of discovery and connected his newly discovered effect, discovery, function, principle, or motive power with some particular medium or mechanical contrivance by which, or through which, it may be made to act upon the material world. Under the patent act of the United States the inventor can control his invention or discovery only through the means by which he brought it into practical action. It is obvious that if a new discovery, effect, function, principle or motive power is produced by an old machine in its unaltered state, no patent can be obtained therefor, for it would be a patent for a discovery, effect, function, principle or motive power only, or an analogous effect, popularly termed "double use." But if the new discovery, effect, function, principle or motive power entails a change in the construction of the machine, device or apparatus, however apparently slight that change may be, it would

be an invention, in the sense of the law, and a patent therefor to secure to the inventor the control of such discovery, effect, function, principle or motive power produced by that change will be granted and can be legally supported. An abstract must be resolved into a concrete; a patent must be for a thing, not for a mere idea. This is the sum and substance of the law on this important subject.

24. Q. Is a change in the form of an article patentable?

A. No; a mere change of form or proportion where no new result or advantage is obtained is not patentable. A mere substitution of wood, bone, or rubber for metal, or one for another kind of metal is not patentable. The making of a structure in a solid casting instead of attached parts is not patentable. But if some new and useful result is obtained by any of the enumerated changes, such as an increase in the efficiency, or a saving in the operation or manipulation of such article, the change is patentable. But useful, patentable and profitable changes of form, changes of proportion, substitution of material, etc., are not at all impossible; they have been and are constantly being made. Look at the numerous simple changes in

suspender and harness buckles, the numerous changes in sewing machine shuttles, the highly beneficial change of proportion of the "high arm" sewing machine, the substitution of steel for the boney substance of the goose quill, the substitution of rubber for iron tires of vehicles, or the substitution of metal for wood in the construction of bedsteads, and other instances too numerous to mention. Such changes and substitutions are commercially very profitable, and if they conserve some useful purpose are patentable.

25. Q. Is an advantageous change of a curve or angle patentable?

A. Yes; it has been decided that as curves and angles become of importance, in plow shares, water wheels, rotary pumps, engines and blowers, and in certain other mechanical contrivances in which the change of a curve or an angle produces a new and useful result, it is patentable.

26. Q. Is the assemblage of two or more articles of common use into a unitary structure patentable?

A. No; an assemblage of two or more independent articles of common use into a unitary struct-

ure, such as a knife, fork, spoon, screw driver, corkscrew, etc., or some similar combination of articles, instruments, or implements, assembled into a unitary structure is not patentable. But if such a combination conserves to some useful end, it is patentable. For instance, the combining of a spade or shovel with a scraper, to scrape off the adhering dirt from the spade or the shovel; or a drill press with a vice, to hold the work while drilling it; or some similar combination of two or more independent articles of common use so combined as to perform jointly some new and useful act, is a patentable combination.

27. Q. Is an air-ship or a perpetual-motion device patentable?

A. Yes; but no patents will be granted on air-ships without a practical demonstration; nor will perpetual-motion inventions be considered without a practical demonstration of a full-sized working machine. The Patent Office refuses to accept applications for patents for perpetual-motion inventions and a working machine has never yet, and perhaps never will be, presented. Don't misapply your energy and ingenuity, and don't waste your valuable

time on air-ships and perpetual-motion devices. These are considered by the greatest men in the world as unattainable objects. Air navigation may, however, be achieved some day, but probably not without some ballooning device. At any rate it is a serious undertaking, requiring an immense amount of time and money with a slim chance of returns.

28. Q. What is the legal purport of the words "principles of a machine"?

A. By the words "principles of a machine", as the words are used in the statute, is meant the [1] peculiar device or manner of producing a given effect of any kind. The principles of a machine may be new to produce either a new or an old effect. For instance, in the Remington typewriter the platen is shifted to print capital letters, while in the Rem-Sho. the type basket is shifted to print capitals. The latter machine produces the same old effect, but by a new principle. Another illustration of a new principle is the key levers of the Remington typewriter, which swing vertically, while those of the Smith-Premier typewriter turn or rock in bearings laterally. A new principle of an old effect, even if it conserves no useful purpose,

is a very good legal and commercial invention. [2] Competition demands frequent changes. Furthermore, some old principles do not yield to improvements very readily, while new principles, to produce the same old effect, often lend themselves to improvements (see answer to question 22.).

THE SPIRIT OF OUR PATENT LAWS CONCERNING PATENTABILITY OF INVENTION AND DISCOVERY.

The subject of patentability is one that vexes not only inventors, but even some patent attorneys; in the preceding answers on this important subject I have endeavored to cover such as are most likely to come to the student's notice, but the subject is practically inexhaustable. The full text of the section of the Patent Act bearing on patentability of invention, is: "Sec. 4886. Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or dis-

covery thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor. * * *" The following few illustrations of the spirit of the patent laws may, in connection with the letter of the laws hereinbefore explained and the section just quoted, greatly assist the inventor in determining the patentability of his invention:

The discoverer of any new abstract principle, art, process, discovery, effect, function or motive power, as stated, is not entitled to a patent therefor. [3] To be a useful invention every one of these must be reduced to practice so as to be available in some practical form. For instance, one who has found out that a blast of hot air, instead of cold, would increase the product of the furnace and change the nature of the iron, was held not entitled to a patent therefor. But, when one set of machinery has been contrived by him by means of which this finding was carried into effect, it was held that the discoverer was entitled to such claims as to secure

to him the exclusive use of the hot blast in every form. More than this, other machinery, better suited to the purpose to increase the product of the furnace by means of the hot blast, was held to be an infringement. Again, the discovery of any new natural substance entitles no one to the exclusive use of it, [4] unless new properties are imparted to the substance by an artificial process, in which case a patent would issue to the discoverer and secure to him all the benefits resulting therefrom. A new marl, mineral or other fertilizer, for instance, in its natural state is not patentable; but if that fertilizer requires grinding or some other process or mechanical operation to make it available for fertilizing purposes, it would be patentable under the process of the grinding or such other mechanical operation necessary to make it available for practical use. [5] Nature is the common property of mankind and can not be monopolized. Likewise, a mere change of the form of an article or of its proportion, as previously stated, is not regarded as an improvement unless some new and useful property is established, such as an enlargement upon the scope of its operation, reduction of cost of its manufacture, or something equivalent thereto. For ex-

ample, a patent having been obtained for an improvement in making friction matches with a new compound. Objection was made to it because the same ingredients had been used for the purpose before, but the objection was overruled, and the patent sustained, [6] on the ground that these ingredients had never been employed in the same combination. This combination had for its object a useful result, namely, the production of the article at a cheaper rate. So the mere substitution of one well-known mechanical equivalent for another, as of gear wheels for belting, friction gears for spur or bevel gears, a spring for a weight, a screw for a lever, etc., is not regarded, within the meaning of the patent act, as an improvement. [7] For neither the principle nor the practice of the invention could be regarded as being strictly new and therefore not entitled to the benefit of the patent. Nevertheless, a new combination, or rearrangement of the component parts, of well-known mechanical contrivances for a certain useful purpose, instead of mere substitution, may form the basis of a claim for a patent, if the purpose, by the means proposed, is better accomplished, or is accomplished at a reduction of cost, or [8] establishes a new principle of

the machine. In order that a combination of mechanical powers may be properly protected, if all the parts were old and it embraces some new device, both the combination and the device must be secured to the inventor by properly worded claims. [9] The application of any known process to effect a new result, entirely different from any former one, or one that has been employed heretofore, is patentable. For example, the use of the flame of gas to singe off the superfluous or loose fibres of lace, was deemed an application of the kind, and on this decision it was declared susceptible of being patented. Yet, on the other hand, it has been determined that the new object, to which the process is applied, must not be analogous to the old one. For example, to curl palm leaf for mattresses by the same process which had been used to curl hair for mattresses, was held to be a mere double use of the process and not entitled to a patent. [10] An invention of an ornamental mode of putting up thread, for instance, which gives no additional value to the thread but simply adds to selling it more readily at retail, and for a larger price, is not a useful invention within the meaning of the law,

and therefore not patentable. An invention of this character may be patented as a design.

Whether an invention, under the circumstances, will justify any expectation of a patent, must be determined by the inventor himself or his attorney, and with the aid of the foregoing explanations he should have no difficulty in doing so. In an age so prolific of the results of genius as the present, it would seem as if the store of ingenuity had been exhausted; and yet we see that annually the increase of patents obtained is steady and progressive, and the indications are that it will continue so perhaps to the end of time.

29. Q. What are the fundamental requirements of an application for a patent?

A. The fundamental requirements of an application for a patent are as follows: 1. A concrete and illustrated description of the construction of the invention; 2. A detailed description of the best mode of operating the invention; 3. A detailed description of the principles of the invention; 4. A summary of the construction, the functions, effects, and of the principles of the invention described in the specification. These are the fundamental prin-

ciples upon which a patent is established, and upon the careful preparation and nicety of execution of these parts hangs the fate and validity of the patent.

30. Q. How should the invention be shown and described?

A. The drawings and the specifications must show and describe the invention in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which the invention appertain, or with which it is most nearly connected to make, construct, compound and use the same without the assistance of the inventor.

31. Q. Why should the law demand such a concrete and illustrative application for a patent?

A. For several reasons, principally among which are these: Patents are benignly construed in favor of inventor; but how would the courts know how to construe a patent, if the specification were in an abstract form? The opponent, in his endeavor to overthrow the patent, would contend that the inventor did not mean so, because he did not so specify in his specification, or show in his drawings, etc. Again the public is entitled to protection. How

would one know that he is making or using something that has been patented, if the patent, the publication of which is the only notice to the public what part of the machine or article is patented, does not disclose the invention so clearly and definitely as to be readily understood by the mechanic who makes such articles? And then again, after the expiration of the term for which the patent was granted, the invention becomes public property, and the public must know how to make and use it. This, it will be remembered, is the consideration for which the patent was granted (see answer to question 2). Hence, a scanty specification is likely to invalidate the patent.

32. Q. Would the examiners pass on an application that does not describe and illustrate the invention so very accurately?

A. Occasionally they do. As they are experts in grasping ideas, they are apt to think that others will understand the invention from the scanty specification and pass on it. Quite frequently, however, examiners are obliged to pass on a scanty specification because it is the only kind the inventor or his attorney is able to make out.

33. Q. Are the claims a part of the specification?

A. Yes; the specification concludes with a specific and distinct claim or claims of the part, improvement or combination which the applicant regards as his invention. The claims are a summary of the novel features of construction, effects, functions and principles, or the combination of the parts of the invention described in the specification.

Following is the order of arrangement in the framing of a specification:

(1) Preamble stating your name and residence and the title of the invention.

(2) General statement of the object and nature of the invention.

(3) Brief description of the several views of the drawings.

(4) Detailed description.

(5) Claim or claims.

(6) Signature of inventor.

(7) Signatures of two witnesses.

34. Q. Is a patent founded on the specification or the claims?

A. The patent is based on the specification and

the claims; the specification and the drawings interpret the claims.

35. Q. What constitutes a complete application for a patent?

A. A complete application for a patent comprises the first Government fee of $15, a petition, a specification, oath, drawings and a power of attorney, when the applicant is represented by an attorney.

36. Q. If the examiners pass the case to issue, is not that sufficient evidence that the specification and drawings are executed in accordance with the requirements of the law?

A. No; for the reasons given in the foregoing answers. Examiners pass to issue many defective and insufficient specifications because, as stated, they cannot get the applicant or his attorney to furnish a better one. It is to the inventor's interest that the specification and the drawings shall show and describe the invention as accurately, clearly and distinctly as possible. The description and the drawings should be accommodated to the comprehension of practical mechanics without taxing their ingenuity or inventive powers. Ambigu-

ity will invalidate a patent for an invention that would otherwise have been sustained. [1] It is a rule of law that when the invention is so loosely and inaccurately described in the specification, that the courts can not, without resorting to conjectures, gather what it is, then the patent is void.

REQUISITION OF SPECIFICATION AND CLAIMS.

The full text of the section of the Patent Act bearing on the specification and claims, is: "Sec. 4888. Before any inventor or discoverer shall receive a patent for his invention or discovery he shall make application therefor, in writing, to the Commissioner of Patents, and shall file in the Patent Office a written description of the same, and the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as distinguish it from

other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery. The specification and claim shall be signed by the inventor and attested by two witnesses." The main object of the specification is thus to tell the mechanic how to make the machine. The subject is of such great importance that we can not learn too much of it. A mechanic is not supposed to be an inventor or a mind reader, or a logician; if you want him to carry out your orders you must tell him in simple and unmistakable language just what you want him to do. If you write an order to your mechanic like this: "Go down into the cellar of my house and stop a leak in the roof," your ambiguity will cost you money; the mechanic will charge you for the time he and his helper have wasted in hunting for a roof in your cellar. Of course you would blame the mechanic for his stupidity, because you meant for him to go down into the cellar and get the pot of paint there, and then go up on the roof of your house and stop the leak therein, but you did not say so. Precisely the same view is taken by the courts. When your patent is litigated and impeached and vitiated for ambigu-

ity, no notice is taken of explanations of what you or your attorney meant by such and such an expression; you simply broke the contract between you and the Government and your patent is null and void. The author has just examined a patent which read thus: "Upon the face of the dial is located a guide dial A, with a pointer *a* 'fixed' over it;" on the second page of same specification is a statement like this: "A wheel *ax* 'moves' the guide dial hand *a*." Here the inventor's attorney called the pointer "hand", but this does not matter, though it is not proper to term an element by different names in the same specification, but so long as he indicated the hand or pointer by the same reference letter there is no serious objection thereto; but observe that in the first clause the attorney stated that the pointer is "fixed" over the guide dial, while in the second clause he stated that that pointer *a* "moves." If you were a model maker and the inventor sent you this patent to make the model therefrom, you would rivet on a pointer *a* over the guide dial good and tight, for such is his order "fixed," and go on with the construction of the machine until finished; but when the machine was nearly finished you would come to a statement in which your em-

ployer, the inventor, tells you to provide the pointer *a* with a wheel *ax* for the purpose of turning that pointer which you have fixed so as to prevent every possible chance of turning. What would you do under such circumstances? You would tell that inventor, your employer, "See here, I followed your instructions to the letter and made the machine just as you directed me, and made the pointer 'fixed'; now as your machine refuses to work with a fixed pointer, if you want me to make another machine with a pointer *a* that 'moves' you must pay me for this one first; the fact that the machine with the fixed pointer is no good to you does not concern me; I have spent my time on it, and my time must be paid for; the blunder is yours, not mine." The student will readily see the justice and wisdom of vitiating such patents. Careless or indifferent inventors and ignorant attorneys [2] would keep the public cutting and trying, wasting time, money and material.

Let it be remembered that the principle object secured by the specification is such a full description of the invention that after the patent has expired the public will know how to avail themselves of it with reasonable facility without the assistance

or further explanation of the inventor. It is not necessary for this that the description should be so minute, full and clear that any man, however ignorant on the subject, shall be able to make and use the machine; it is enough if, to adopt the expressions of the statute, [3] it will enable any person skilled in the art or science to which the invention appertains, or with which it is most nearly connected, to make, construct, compound and use the same. Neither, on the other hand, will it suffice if the specification were couched in such terms that none but experts of the highest ingenuity can understand it, or reduce it to practice. [4] A person of ordinary capacity and skill should be able to follow it and put it into operation without contriving anything new of his own, without making any additions beyond what is prescribed and, it has been decided, without resorting to repeated experiments. The latter rule should, however, be qualified. Where, for instance, materials are to be worked upon which are variable in their nature and require that the ingredients employed in producing the result should be used in different proportions, it is often the case that the inventor himself could not determine upon the

proper proportion without experiment. A patent for a valuable flux would not be vitiated because the quality to be used with a new combination of ores could be ascertained only by trial. Such alterations also in the dimensions or proportions in the different parts of a machine as an ordinary mechanic would readily see were needed to make it operate successfully, would not impair the validity of a patent. The materials to be employed must be such as are well known to persons conversant with the subject; if they are described in terms calculated to mislead, it will be deemed a fraud. In short, care must be taken to disclose everything which is essential toward accomplishing the object to the best advantage as far as is known. On the other hand, nothing must be introduced as a part of the invention, which does not contribute to the result. [5] No secret improvement must be kept in reserve to enable the inventor to command the market after his patent has expired; for this would be deemed and taken as equally fraudulent. Neither, must he impair the usefulness of his invention or discovery by inducing others to employ something as necessary to success, which serves no useful purpose. The act of Congress requires that the inven-

tor shall "explain the principle thereof [of the invention] and the best mode in which the applicant has contemplated applying the principle in such manner as to distinguish it from other inventions." In the act of Congress of 1836 the inventor was required to "fully explain the *several* modes in which he has contemplated the application of the principle." The present provision which requires that only the *best* mode shall be described is much more convenient and more comprehensive. A person writing a specification might not be able to recall all the possible modes of application of the principle of the invention; the principle of the invention may be applicable to something which does not then exist. The present provision is easily complied with by describing the most advantageous mode one may now be contemplating, and insert the word "preferably" or "suitably" or some similar word or words; all other modes will then be understood. Similarly in describing the construction of a certain member of the invention, the word "preferably" renders it more comprehensive, as the words "preferably cylindrical" would be understood to mean that cylindrical is the best mode but that the thing may be square, triangular or flat. Where

the invention consists of an improvement upon machinery already patented, this instruction can not be relied upon. [6] The description must then be confined to the precise improvement or formation of the part as shown and described. If the improvement lies in making the member cylindrical instead of flat or some other shape, then the description of that principle or construction of the member of the machine must, by explicit language, distinguish between what is old and what is claimed as new. The usual and approved course is, to describe all the apparatus employed, both old and new, as far as is requisite to make the operation of the invention perfectly clear. Such machinery as is already known to persons of ordinary skill in the business, and in which no alterations are proposed, needs only to be referred to by name; for instance, the valves of a pump; if the invention lies in the piston only, the name valve is sufficient without describing its construction. But when alterations in the usual form are necessary, such alterations should be clearly pointed out, and especially everything that is new in them. All that contributes to the new result and forms a part of the invention should be particularly described. If any method of effecting

the object is claimed which proves ineffectual, or which has been anticipated by a prior patent, it may invalidate the patent.

The law requires that a specific and distinct claim or claims of the part, improvement or combination which the applicant regards as his invention or discovery should conclude the specification. After describing the whole mechanism employed, old as well as new, the invention relied on is set out with precision and claimed. The claims are a summary of the novel features or combinations described in the specification—but this subject will be more extensively treated in this book after the specification and illustrations have been disposed of.

From the foregoing explanation the student should have a clear idea of how a specification must be written to comply with all the requirements of the law. In patent matters one should be satisfied with nothing but absolute accuracy in every detail. Inventors who feel themselves capable of preparing and prosecuting their own cases should place themselves under the supervision of a competent patent attorney who should inspect the application before it is filed, and examine every action and subsequent amendment thereon.

37. Q. Does the Patent Office require a working model of the invention to accompany the application?

A. No; unless the invention is, in the opinion of the examiner, inoperative, in which case he may call for a model which must then be just as the drawings portray it.

Most every invention, however complicated it may be, can usually be shown up and described so lucidly that the examiner will readily understand it and see its operativeness and not call for a model, unless it is a flying, perpetual-motion or similar machine or thing the operativeness of which has never been demonstrated. Ordinarily, models are now called for only in cases where the invention from the description and the illustration, which may simply be obscure or incomplete, appears inoperative; in such cases it is better to abandon the application and file new, properly prepared specification and drawings, for the model will never work as shown and described; but in a case where the application is properly prepared but the invention is of a nature that only a model will demonstrate its operativeness, a model should be made and furnished.

Following is the full text of the rules relating to models.

THE MODEL.

1. Preliminary examinations will not be made for the purpose of determining whether models are required in particular cases. Applications complete in all other respects will be sent to the examining divisions, whether models are or are not furnished. A model will only be required or admitted as a part of the application when on examination of the case in its regular order the primary examiner shall find it to be necessary or useful. In such case, if a model has not been furnished, the examiner shall notify the applicant of such requirement, which will constitute an official action in the case. When a model is received in compliance with the official requirement, the date of its filing shall be entered on the file wrapper. Models not required or admitted will be returned to the applicants. When a model is required, the examination will be suspended until it shall have been filed. From a decision of the primary examiner overruling a motion to dispense with a model an appeal may be taken to the Commissioner in person.

2. The model must clearly exhibit every feature of the machine which forms the subject of a claim of the invention, but should not include other matter than that covered by the actual invention or improvement, unless it be necessary to the exhibition of the invention in a working model.

3. The model must be neatly and substantially made of durable material, metal being deemed preferable; but when the material forms an essential feature of the invention, the model should be constructed of that material. The model must not be more than one foot in length, width, or height, except in cases in which the Commissioner shall admit working models of complicated machines of larger dimensions. If made of wood, it must be painted or varnished. Glue must not be used; but the parts should be so connected as to resist the action of heat and moisture. When practicable, to prevent loss, the model or specimen should have the name of the inventor permanently fixed thereon. In cases where models are not made strong and substantial as here directed, the application will not be examined until a proper model is furnished.

4. A working model is often desirable, in order

to enable the office fully and readily to understand the precise operation of the machine.

5. In all applications which have remained rejected for more than *one year* the model, unless it is deemed necessary that it should be preserved in the office, may be returned to the applicant upon demand and at his expense; and the model in any pending case of less than *one year's* standing may be returned to the applicant upon the filing of a formal abandonment of the application, signed by the applicant in person.

Models belonging to patented cases shall not be taken from the office except in the custody of some sworn employe of the office specially authorized by the Commissioner.

6. Models filed as exhibits in contested cases may be returned to the parties at their expense. If not claimed within a reasonable time, they may be disposed of at the direction of the Commissioner.

38. Q. What are the drawings to the patent?

A. The drawings are to illustrate the exact shape of every detail of the invention, and the parts of the old structure with which it cooperates, that is described in the specification. The drawings form

a part of the specification and at issue become part of the patent.

39 Q. How should the drawings be made?

A. If the student happens to be an artist, and a good one, and wishes to make his own drawings he may do so by following these rules which are rigidly enforced by the Patent Office:

THE DRAWINGS.

1. The applicant for a patent is required by law to furnish a drawing of his invention whenever the nature of the case admits of it.

2. The drawings may be signed by the inventor, or the name of the inventor may be signed on the drawings by his attorney in fact, and must be attested by two witnesses. The drawing must show every feature of the invention covered by the claims, and the figures should be consecutively numbered if possible. When the invention consists of an improvement on an old machine the drawing must exhibit, in one or more views, the invention itself, disconnected from the old structure, and also in another view so much only of the old structure as

will suffice to show the connection of the invention therewith.

3. Three several editions of patent drawings are printed and published—one for office use, certified copies, etc., of the size and character of those attached to patents, the work being about 6 by 9 1-2 inches; one reduced to half that scale, or one-fourth the surface, of which four are printed on a page to illustrate the volumes distributed to the courts; and one reduction—to about the same scale—of a selected portion of each drawing for the Official Gazette.

This work is done by the photolithographic process and therefore the character of each original drawing must be brought as nearly as possible to a uniform standard of excellence, suited to the requirements of the process, and calculated to give the best results, in the interests of inventors, of the office, and of the public. The following rules will therefore be rigidly enforced, and any departure from them will be certain to cause delay in the examination of an application for letters patent:

(1) Drawings must be made upon pure white paper of a thickness corresponding to three-sheet Bristol-board. The surface of the paper

must be calendered and smooth. India ink alone must be used, to secure perfectly black and solid lines.

(2) The size of a sheet on which a drawing is made must be exactly 10 by 15 inches. One inch from its edges a single marginal line is to be drawn, leaving the "sight" precisely 8 by 13 inches. Within this margin all work and signatures must be included. One of the shorter sides of the sheet is regarded as its top, and, measuring downwardly from the marginal line, a space of not less than 1 1-4 inches is to be left blank for the heading of title, name, number, and date.

(3) All drawings must be made with the pen only. Every line and letter (signatures included) must be absolutely black. This direction applies to all lines, however fine, to shading, and to lines representing cut surfaces in sectional views. All lines must be clean, sharp, and solid, and they must not be too fine or crowded. Surface shading, when used, should be open. Sectional shading should be made by oblique parallel lines, which may be about one-twentieth of an inch apart. Solid black should

not be used for sectional or surface shading.

(4) Drawings should be made with the fewest lines possible consistent with clearness. By the observance of this rule the effectiveness of the work after reduction will be much increased. Shading (except on sectional views) should be used only on convex and concave surfaces, where it should be used sparingly, and even there should be dispensed with if the drawing is otherwise well executed. The plane upon which a sectional view is taken should be indicated on the general view by a broken or dotted line. Heavy lines on the shade sides of objects should be used, except where they tend to thicken the work and obscure letters of reference. The light is always supposed to come from the upper left-hand corner at an angle of forty-five degrees. Imitations of wood or surface graining should not be attempted.

(5) The scale to which a drawing is made ought to be large enough to show the mechanism without crowding, and two or more sheets should be used if one does not give sufficient room to accomplish this end; but the number

of sheets must never be more than is absolutely necessary.

(6) The different views should be consecutively numbered. Letters and figures of reference must be carefully formed. They should, if possible, measure at least one-eighth of an inch in height, so that they may bear reduction to one twenty-fourth of an inch; and they may be much larger when there is sufficient room. They must be so placed in the close and complex parts of drawings as not to interfere with a thorough comprehension of the same, and therefore should rarely cross or mingle with the lines. When necessarily grouped around a certain part, they should be placed at a little distance, where there is available space, and connected by short broken lines with the parts to which they refer. They must never appear upon shaded surfaces, and when it is difficult to avoid this, a blank space must be left in the shading where the letter occurs, so that it shall appear perfectly distinct and separate from the work. If the same part of an invention appears in more than one view of the drawing it must always be represented by the same char-

acter, and the same character must never be used to designate different parts.

(7) The signature of the inventor should be placed at the lower right-hand corner of each sheet, and the signatures of the witnesses at the lower left-hand corner, all within the marginal lines, but in no instance should they trespass upon the drawings. The title should be written with pencil on the back of the sheet. The permanent names and titles will be supplied subsequently by the office in uniform style.

When views are longer than the width of the sheet, the sheet should be turned on its side, and the heading will be placed at the right and the signatures at the left, occupying the same space and position as in the upright views, and being horizontal when the sheet is held in an upright position; and all views on the same sheet must stand in the same direction.

(8) As a rule, one view only of each invention can be shown in the Gazette illustrations. The selection of that portion of a drawing best calculated to explain the nature of the specific improvement would be facilitated and the final

result improved by the judicious execution of a figure with express reference to the Gazette, but which might at the same time serve at one of the figures referred to in the specification. For this purpose the figure may be a plan, elevation, section, or perspective view, according to the judgment of the draftsman. It must not cover a space exceeding 16 square inches. All its parts should be especially open and distinct, with very little or no shading, and it must illustrate the invention claimed only, to the exclusion of all other details. When well executed, it will be used without curtailment or change, but any excessive fineness, or crowding, or unnecessary elaborateness of detail will necessitate its exclusion from the Gazette.

(9) Drawings should be rolled for transmission to the office, not folded.

4. All reissue applications must be accompanied by new drawings, of the character required in original applications, and the inventor's name must appear upon the same in all cases; and such drawings shall be made upon the same scale as the original drawing, or upon a larger scale, unless a reduction of scale shall be authorized by the Commissioner.

5. The foregoing rules relating to drawings will be rigidly enforced.

40. Q. What is a patent attorney?

A. A patent attorney is a recognized practitioner before the Patent Office, possessed of the necessary qualifications to prepare, present and prosecute applications for patents.

41. Q. Who employs the patent attorney?

A. The inventor employs the patent attorney and empowers him to represent him before the Patent Office by giving him an instrument in writing called "power of attorney" which the attorney files with the application.

42. Q. Can the power of attorney be revoked?

A. Yes; the inventor can revoke the power of attorney he has given to his attorney at any stage of the proceedings in the case, if he is not satisfied with the attorney's services.

43. Q. How is the power of attorney revoked?

A. By filing a "revokation of power" in the Patent Office. Your next attorney will attend to that for you.

44. Q. Who makes the patents?

A. The patents are made by the patent attorneys, not by the Patent Office, as some suppose; the official certificate of the Government grant with the official seal of the Patent Office is attached to the patent the attorney has made out. The Patent Office has no right, even so much as to change one word in the patent without the written consent of the inventor or his attorney. It is for this reason that we see so many poorly described and badly worded patents.

45. Q. Can the Patent Office aid the inventor in the selection of a competent patent attorney?

A. No; it cannot; and in its Rules of Practice it advises the inventor to employ the services of the most competent attorney to represent him before the Patent Office. Inasmuch as the value of a patent depends largely upon the skillful preparation of the specification and the claims, the importance of employing a competent patent attorney cannot be overrated. Judging from the large number of rejected applications and the commercially and legally worthless patents that are issued every year, it is safe to say that the number of incompetent attorneys that are now practicing before the United States Patent Office is alarmingly great. The Com-

missioner of Patents expresses his knowledge of the fact thus: [2]"So many persons have entered this profession of late years, without experience [without a thorough and practical knowledge and qualifications for the profession], that too much care can not be exercised in the selection of a competent man." This is mild enough, but sufficient to impress the inventor with the importance of exercising great care in the selection of a "competent man."

46. Q. What remedy has the inventor if the attorney makes out a patent that is later impeached and vitiated in the courts for ambiguity or insufficient specification or claims?

A. None whatever; the inventor must abide by the actions of his attorney. He has no legal remedy against him except, of course, in case of fraud. Inventors should be very careful in the selection of a patent attorney. Place no credence in advertisements, highly colored hand books, sonorous names of companies, and all offers to do something for nothing; these are, generally, cunningly devised delusions to ensnare the unsuspecting inventor.

47. Q. What is the administration of the Patent Office?

A. The administration of the Patent Office is directed toward the examination of all the documents of the application presented by the inventor's attorney (five in number) to see that they are prepared and presented in proper form as prescribed by law. The examiners examine the Patent Office records in the class to which the invention appertains to find out whether the inventor does not claim more than he is legally entitled to (less does not trouble them).

Applications filed in the Patent Office are classified according to the various arts, and are taken up for examination in regular order of filing, those in the same class of inventions being examined and disposed of, as far as practicable, in the order in which the respective applications are completed.

The following new applications have preference over all other new cases at every period of their examination in the order enumerated:

1. Applications wherein the inventions are deemed of peculiar importance to some branch of the public service, and when for that reason the head of some Department of the Government requests immediate action and the Commissioner so orders; but in such cases it is the duty of such head

of a Department to be represented before the Commissioner in order to prevent the improper issue of a patent.

2. Applications for reissue.

3. Applications which appear to interfere with other applications previously considered and found to be allowable, which it is deemed shall be placed in interference with an unexpired patent or patents.

The following applications, previously acted upon, will have preference over other business:

1. Cases remanded by an appellate tribunal for further action and statements of grounds of decisions.

2. Applications which have been put into condition for further action by the examiner are entitled to precedence over new applications in the same class of invention.

3. Applications which have been renewed or revived but the subject-matter not changed.

4. When the inventor dies and his executor or administrator files a new application for the same invention, the new application may be given the same status in the order of examination as the original by order of the Commissioner.

Inasmuch as applications cannot be examined out

of their regular order, except in accordance with the foregoing provisions, and Members of Congress can neither examine nor act in patent cases, inventors should refrain from imposing upon Senators or Representatives labor which will consume their time without any advantageous results; nor hasten their attorneys, for it is entirely beyond their control; they must invariably await their turn. Where the specification and the claims are such that the invention may be readily understood, the examination of a complete application and the action is at once directed throughout to the merit of the case; but if the invention appears inoperative, lacks utility, or the application papers are not in proper form, or the application claims more than one invention, these matters must be straightened out before any action will be taken on the merits.

48. Q. How does the examiner examine an application?

A. Every examiner has a complete digest of all the United States and foreign patents of his class; he has also access to the caveats, abandoned and forfeited applications, and all sorts of publications, catalogues and pamphlets. When an application is examined all these patents, etc., are

carefully inspected and compared with the drawings of the case under examination; any part, feature, effect, function, principle or combination of parts that is found in any of those patents or publications which anticipates a claim or claims under examination depicting such is cited for reference and such claim or claims are rejected upon it; as such invention is no more "new and not known." Often a number of patents is collectively cited against a single claim, or a number of claims is rejected upon a single reference; but as the examiner does not stop to read the reference he cites, he often cites such that have little or no bearing on the claims he rejected. His idea is that if the claims rejected upon the references are not met by the references the attorney will argue it out with him on the records; if the attorney fails to do so, the claims remain rejected.

49. Q. Does the examiner reject all the claims of the application or only some of them?

A. In a case in which the invention possesses some novelty, the broadest claims alone are attacked; if the narrow ones are in proper form they are at once allowed.

50. Q. Does every patent have broad and narrow claims?

A. Every good patent has, so that in case the patent is litigated and the broadest claims are invalidated, there will still remain some claims in the patent to carry on business against competition.

51. Q. Since the broad claims are subject to invalidation, of what value are they to the inventor?

A. The broad claims alone secure the absolute monopoly of the invention to the patentee. There is now a greater probability of such claims to be sustained by the courts than before, as inventions are now scrutinized, in the Patent Office, with the greatest care. The possibility of invalidation should never weaken the effort to secure the broadest possible claims.

52. Q. How broad should claims be?

A. As broad as the Patent Office will allow them.

53. Q. Will the Patent Office allow very broad claims?

A. If it has no reference to cite against them, it must allow the claims, however broad they may be.

54. Q. What is a broad claim?

A. A claim that is so worded that the making of the invention by a person—other than the patentee —in any modified form, would be impossible without liability to the patentee.

55. Q. Do claims rejected by the examiner remain rejected?

A. No; if the attorney in the case is an able and willing man, he will read the references, cited by the examiner, with the greatest care; and if the rejected claims are met in letter or spirit by the references, he will, in accordance with the law on the subject of Amendment and Actions, revise the rejected claims just sufficiently to avoid the references, but will retain in them all the vitality it is possible in view of the state of the art. If, however, in his opinion, the references do not anticipate the invention he will use every possible argument to convince the examiner of his client's right to the rejected claims and thus secure their allowance.

56. Q. What is meant by the words "state of the art"?

A. The words "state of the art" mean the condition of the class to which a certain invention appertains. Any part of an invention found in its

class shows that that part is no more new and therefore can not be claimed broadly. In other words, it shows that the state of the art has reached such a point that it embraces the novel part or feature of the alleged invention.

57. Q. What if the examiner should again reject the claims?

A. The attorney will repeat the operation several times if necessary, until he secures the allowance of the rejected claims, remodeling the claims in accordance with the new references or reasons for rejection cited by the examiner.

58. Q. Does the examiner cite new references at every action?

A. If the attorney persists in his client's right to the claims, the examiner will make every possible effort to find new references against them, and he often does find them.

59. Q. What would an incompetent attorney do if the claims were rejected upon certain references?

A. An incompetent attorney usually presents such narrow claims in the first place that, except for informality, they are at once allowed, and if some of

them are rejected he seldom makes an effort to regain them, but either patches them up carelessly just to please the examiner, or cuts them out entirely and lets the case go to allowance with the remaing few narrow claims.

60. Q. If the attorney should fail to make the claims to which his client is legally entitled, would not the examiner tell him or make him do so?

A. No; because the attorney is supposed to know the state of the art better than the examiner, and the law presupposes that if the attorney does not make the claims it is because he knows that his client is not entitled to them, or he does not think the invention of sufficient importance, or that he simply wishes to abandon that part of the invention.

61. Q. Is it not the duty of the Patent Office to look after the inventor's interests?

A. No; it is the attorney's duty to look after the inventor's interests. The Patent Office represents the grantor, the attorney represents the grantee, and the inventor gets such claims as the attorney is able and willing to make out of the examiners by contentions, arguments and convictions of his client's right to them.

62. Q. In the matter of contention between the attorney and the examiner, who is to have the benefit of the doubt?

A. It has been decided that when the differences of construction between the device claimed and the references cited against it are such that a doubt is raised as to whether it constituts a patentable invention, the inventor should have the benefit of the doubt.

63. Q. If the examiner insists that the claims are, without doubt, met by the references, while the attorney contends that his client is entitled to such claims, or the examiner has certain other reasons for rejecting the claims, and the contention between the examiner and the attorney can not be settled, what remedy does the law provide?

A. The law provides a remedy for it. It prescribes that any applicant for a patent, if any of the claims of his application have been twice rejected for the same reasons, may, upon payment of a fee of $10, appeal from the decision of the primary examiner to the examiners-in-chief. The appeal must set forth in writing the points of the decision upon which it is taken, and must be signed by the applicant or his duly authorized

attorney. The examiners-in-chief are persons of competent legal knowledge and scientific ability; it is their duty to review the reasons presented by both parties (the examiner and the attorney) to the contention, and decide upon the lines of law and justice. For full text of the rules governing appeals see answer to question 88—Rules 41 to 58 inclusive.

64. Q. What is a combination claim?

A. Virtually, every properly-drawn claim is a combination claim; but the term "combination claim" is properly applied to a claim, in a patent for an improved article, which is so worded as tc secure to the inventor the elements of the old structure of the article. By properly combining the elements of the old article with the elements of the invention, all similar improvements in such articles by others become impossible without liability for infringement to the patentee.

65. Q. Do the elements of the old article become the patentee's invention?

A. No; the elements of the old structure become a part of his invention, but not his invention.

66. Q. Is such a claim of any importance?

A. Yes; such claims in patents for improvements on old articles are of the greatest importance; in fact, they are the "all-important" claims, and should be drawn with the greatest care in both generic and specific terms; particularly when the improved feature is entirely dependent upon the old article. Take, for instance, an improved frying-pan handle, made hollow to prevent scorching the fingers, by itself it would be practically useless, but in conjunction with the frying-pan it performs a useful function—it prevents burning the fingers.

67. Q. What material difference does it make whether the elements of the old article are a part of the patentee's invention or they are his invention, as long as he can hold them by virtue of a properly constructed combination claim, as previously noted?

A. All the difference in the world. The frying-pan referred to is marked "patented" because it embodies an improved handle, but the word "patented" does not signify that the maker of this pan has alone the exclusive right to make, use, or vend, frying-pans, as would be the case if the frying-pan were his invention, but that he has the exclusive

right to make, use, or vend frying-pans with cool handles.

68. Q. If the frying-pan were the invention of one whose patent has not yet expired, would the Patent Office allow the cool-handle inventor such claims that would secure to him the frying-pan proper in conjunction with the cool handle?

A. Yes; the Patent Office will grant a patent upon a patent, if the latter patent contains some improvement over the former patent, and whether that improvement is a substantial part thereof or a mere addition thereto.

69. Q. If so, then the cool-handle inventor would have the advantage over the frying-pan inventor, as the former's claims cover the latter's invention and secure to him the use of the pan, while the latter's claims do not cover the former's invention. Is not that unjust?

A. Most decidedly; it would be a great injustice to the first inventor if such were the laws on the subject. But the law is that if another person invent an improvement in a machine or thing he can entitle himself to a patent for the improvement only, and does not thereby acquire the right to use the original invention.

70. Q. In that event, of what benefit is a patent for an improvement on a patented article?

A. Of great benefit; the original invention is usually crude and of low efficiency, or complex and intricate, and therefore often a total commercial failure. The second inventor, who is improving upon the original invention, usually eradicates all the errors of the first inventor and renders the device or article a commercial success. Thus, the first inventor, in order to make anything out of his invention, is compelled either to join forces with the second inventor or to buy him out. If, however, the first inventor's patent is near expiration the second inventor may prefer to wait a year or two and then have the use of the original invention, if he does not care to join the first inventor. The second inventor usually gets the bigger end of the transaction in either case. There are hundreds of patents for improvements on the original sewing machine, typewriter, bicycle, steam engine, and on most every original invention ever patented, and the succeeding inventors make more money out of their improvements than their predecessors, and often of the original inventors.

71. Q. What is a generic claim?

A. A claim so worded as to depict the principal novel elements and functions of the invention in comprehensive language, as the words "a cool-handle frying-pan," would cover a frying-pan provided with a wooden handle, a hollow sheet-iron handle, a coiled-wire handle, or a frying-pan with any other imaginable handle that would prevent scorching the fingers.

72. Q. Since the law demands that each claim in a patent shall be specific and distinct, how would the words "cool handle" include a wooden handle, when a hollow-sheet metal handle is shown and described?

A. The courts have decided that, although the patentee does not expressly claim equivalents, he is understood to embrace them, and by properly constructed claims does in contemplation embrace them. It is understood, of course, that our assumption is that a wooden pan-handle has never been known or used before the inventor's invention of a cool handle; if it were, the word "metal" would have to be inserted in every claim and thus exclude the wooden handle from the claims. Any equivalent of a cool metal handle would then be distinctly and specifically understood.

73. Q. Why should the invention described in the specification be repeated in the claims?

A. As already remarked, in answer to question 34, the claims are a summary of the novel features shown in the drawings and described in the specification. After the patent is issued, the inventor's rights are wholly restricted to the exact terms of the claims upon which his patent is based and which depicts his precise invention. It does not then matter how original his invention was at the time his application was filed, nor does it matter how broad is the application of his invention, how great and important is the benefit of his invention to mankind, nor how simple and insignificant his invention is. It is the precise construction (specific or generic) just as depicted in the claims that the patent secures to the inventor, and no more. The precise invention being summed up in the claims, the specification and the drawings are then referred to only for an explanation of the meaning of the terms used in the claims, which they interpret. The claims are thus the most material part of the patent and their preparation and prosecution should never be entrusted to one of questionable ability.

74. Q. Does it ever happen that an attorney claims more than his client is justly entitled to?

A. Yes; quite frequently; for it is impossible for the attorney to know the state of the art without spending several days, and often weeks, in searching the records of the Patent Office, so a good attorney makes the broadest claims possible and amongst them are often some to which the inventor is not entitled.

75. Q. Can the inventor hold such claims?

A. No; he can not; the law prescribes that whenever through inadvertance, mistake or accident, and without any fraudulent or deceptive purpose, a patentee has claimed as his invention more than that of which he was the original inventor or discoverer, his patent shall be valid for all that is truly and justly his own, and he may make disclaimer of such parts of the thing patented as he shall not choose to claim or to hold by virtue of his patent.

76. Q. When should such disclaimer be made?

A. Disclaimer is usually made when the patentee is to sue for infringement upon his patent, or when he is sued by another for infringement upon

the other's rights. A disclaimer, to be effectual for all intents and purposes, must be filed in the Patent Office before the suit is brought. Unless it is filed before the suit, the plaintiff will not be entitled to recover costs in such suit, even if he should establish at the trial that a part of the invention not disclaimed had been infringed upon by the defendant. But whether a disclaimer has been filed before or after the suit is brought, the plaintiff will not be entitled to the benefit thereof if he has unreasonably neglected or delayed to enter the same at the Patent Office; but an unreasonable neglect or delay will not constitute a good defense and objection to the suit. Under the former law a patent was void if the patentee claimed more than he had invented; our present law is that the patent shall be valid for all that part that is truly and justly the patentee's invention, and that he, the patentee, may, if he chooses so to do, make disclaimer of such parts of the thing patented as he shall not choose to claim or hold by virtue of his patent. Hence, he may or he may not disclaim the part that is not his own without invalidating his patent.

77. Q. What is an infringement?

A. An infringement is an act of trespassing

upon the incorporeal right secured to the inventor by the grant of the patent. Any person who, without legal permission from the patentee or assignee, makes, uses, or sells to another to be used the thing which is the subject-matter of an existing patent within the boundaries of the United States, is guilty of infringement.

The infraction of the exclusive privilege secured to the patentee by the grant of the patent is, however, a matter to be decided by the courts; it being beyond the realm of the Patent Office.

It is a rule in law that every violation of a patent right imports some damage. However, the making of a patented machine or thing, to be an offense within the purview of the patent act, must be for profit. If one makes a patented machine or thing for the mere purpose of philosophical experiments, or to ascertain the verity and exactness of the specification or claims, no damages can be claimed therefor.

78. Q. Where should action against an infringer be brought?

A. Action against an infringer, must be brought in the United States Circuit Courts, which have jurisdiction of patent causes. The patentee

can obtain an injunction compelling the infringer to stop such manufacture and sale, and to account for the profits already made. When the patent in issue has already been litigated and sustained, a temporary injunction may be obtained at the beginning of the case before it has been decided on its merits.

79. Q. How is a patent infringed upon?

A. Every claim in a patent is practically a patent by itself. An infringer upon a single claim of a patent is just as much liable for the infraction of that right as he would be if he had infringed upon all the claims of the patent. To constitute an infringement, however, the defendent must have used the same combination, construction and operating substantially in the same way as it is depicted in the claims (see answer to question 73). Hence, if one makes a complete machine or article that is operated precisely as the one covered by a certain claim but omits one element of the combination as it is claimed, or constructs the article with the same number of elements but on a different principle than that which is claimed (not of that as shown in the drawings, but which is claimed), he is not guilty of infringement. But if one simply

adds one or more elements to a combination of elements summed up in a claim of a patent, without changing the operative principle of the machine as depicted in the claim, he is infringing upon that claim or patent (see answer to question 69). But a mere change in the mechanical incidents while retaining the "operative principle," if same is properly covered by a claim, is an infringement in the true sense of the word. It is imperatively essential to the successful maintenance of the exclusive right conferred by the patent that every patent shall have a large number of claims and that the claims thereof shall cover every effect, function, principle and detail of construction of the invention and that the claims shall be so graded that it will be impossible for an infringer to omit a single element or slightly change the principle of the machine or thing without liability to the inventor. But great care must be taken that every phase, function and construction of the invention is distinctly defined in both the specification and claims, as a mere multiplication of nebulous claims is worse than useless.

80. Q. What is an interference?

A. An interference is a proceeding instituted

for the purpose of determining the question of priority between two or more parties claiming substantially the same patentable invention; for it occasionally happens that the same invention is made by independent inventors at approximately the same time.

81. Q. What are proceedings in interference cases?

A. Proceedings in interference cases are in the nature of a contest in equity, and the parties thereto are required, under proper rules, to take the evidence of witnesses touching the date when the contestants first conceived the invention, reduced it to practice, etc. The one who first filed his application for a patent in the Patent Office is called the senior party to the interference and the other the junior party.

82. Q. Upon which of these parties does the burden of proof rest?

A. The burden of proof rests upon the junior party to the interference. It is therefore of the utmost importance to the inventor to file his application for a patent as soon after he has conceived the idea as it is possible for him to do so,

unless he has made a full-sized working machine of his invention, in which case he may take time to test its merits (see answer to question 13.)

Interfering applications do not happen very frequently, but when they do happen they are very costly and troublesome things to handle. It is a curious fact that in most every instance each one of the parties to the interference insists that his opponent somehow got the idea from him and sticks to his groundless assumption as the paper does to the wall, when in reality both parties are original inventors of the invention in controversy. Let it be remembered that only a skilful, shrewd and resourceful attorney is capable of conducting an interference case successfully; such an attorney will not undertake a case unless he is reasonably sure of success. Much depends upon the good judgment, care and ability of the attorney in examining witnesses; slips of the tongue are very fatal in such cases, as they can not be taken back; the alleged dates must be proven beyond the shadow of a doubt and every statement must be corroborated by witnesses or otherwise. Following is the full text of the Patent Office rules governing interference cases; these

should be read very thoughtfully before entering the contest and employing an attorney; they will greatly assist in gauging subsequent actions and movements in the case; they will also assist the reader to arrive at a decision as to whether or not it is feasible for him to enter the contest, as he will then know how he must prove his case:

INTERFERENCES.

1. An interference is a proceeding instituted for the purpose of determining the question of priority of invention between two or more parties claiming substantially the same patentable invention. The fact that one of the parties has already obtained a patent will not prevent an interference, for, although the Commissioner has no power to cancel a patent, he may grant another patent for the same invention to a person who proves to be the prior inventor.

2. Interferences will be declared in the following cases, when all the parties claim substantially the same patentable invention:

(1) Between two or more original applications containing conflicting claims.

(2) Between an original application and an unexpired patent containing conflicting claims, when the applicant, having been rejected on the patent, shall file an affidavit that he made the invention before the patentee's application was filed.

(3) Between an original application and an application for the reissue of a patent granted during the pendency of such original application.

(4) Between an original application and a reissue application, when the original applicant shall file an affidavit showing that he made the invention before the patentee's original application was filed.

(5) Between two or more applications for the reissue of patents granted on applications pending at the same time.

(6) Between two or more applications for the reissue of patents granted on applications not pending at the same time, when the applicant for reissue of the later patent shall file an affidavit showing that he made the invention before the application was filed on which the earlier patent was granted.

(7) Between a reissue application and an unexpired patent, if the original application was pending at the same time, and the reissue applicant shall file an affidavit showing that he made the invention before the original application of the other patentee was filed.

(8) Between an application for reissue of a later unexpired patent and an earlier unexpired patent granted before the original application of the later patent was filed, if the reissue applicant shall file an affidavit showing that he made the invention before the original application of the earlier patent was filed.

3. Before the declaration of interference all preliminary questions must be settled by the primary examiner, and the issue must be clearly defined; the invention which is to form the subject of controversy must be decided to be patentable, and the claims of the respective parties must be put in such condition that they will not require alteration after the interference shall have been finally decided, unless the testimony adduced upon the trial shall necessitate or justify such change.

4. *Whenever two or more applications disclose the same invention, and one of said applications is*

ready for allowance and contains a claim to said invention, the primary examiner will notify the other applicant of such fact, furnish him with a copy of the patentable claim, and require him to make such claim and put his case in condition for allowance within a specified time, so that an interference can be declared. Upon the failure of any applicant to make the claim suggested within the time specified, such failure or refusal shall be taken without further action as a disclaimer of the invention covered by the claim, and the issue of the patent to the applicant whose application is in condition for allowance will not be delayed unless the time for making the claim and putting the application in condition for allowance be extended upon a proper showing. If a party make the claim without putting his application in condition for allowance, the declaration of interference will not be delayed, but after judgment of priority the application of such party will be held for revision and restriction, subject to interference with other applications.

5. When an interference is found to exist and the applications are prepared therefor, the primary examiner will forward to the examiner of interferences the files and drawings; notices of interfer-

ence for all the parties (as specified in Rule 11) disclosing the name and residence of each party and that of his attorney, and of any assignee, and, if any party be a patentee, the date and number of the patent; the ordinals of the conflicting claims and the invention claimed; and the issue, which shall be clearly and concisely defined in so many counts or branches as may be necessary in order to include all interfering claims. Where the issue is stated in more than one count the respective claims involved in each count should be specified. The primary examiner shall also forward to the examiner of interferences for his use a statement disclosing the applications involved in interference, fully identified, the name and residence of any assignee, and the names and residences of all attorneys, both principal and associate, and arranged in the inverse chronological order of their filing as completed applications, and also disclosing the issue or issues and the ordinals of the conflicting claims.

Whenever it shall be found that two or more parties whose interests are in conflict are represented by the same attorney, the examiner will notify each of said principal parties, and also the attorney, of this fact.

6. Upon receipt of the notices of interference, the examiner of interferences will make an examination thereof, in order to ascertain whether the issue between the parties has been clearly defined, and whether they are otherwise correct. If he be of the opinion that the notices are ambiguous or are defective in any material point, he will transmit his objections to the primary examiner, who will promptly notify the examiner of interferences of his decision to amend or not to amend them.

7. In case of a material disagreement between the examiner of interferences and the primary examiner, the points of difference shall be referred to the Commissioner for decision.

8. The primary examiner will retain jurisdiction of the case until the declaration of interference is made.

9. Upon the institution and declaration of the interference, as provided in Rule 10, the examiner of interferences will take jurisdiction of the same, which will then become a contested case; but the primary examiner will determine the motions mentioned in Rule 30, as therein provided.

10. When the notices of interference are in proper form, the examiner of interferences will

add thereto a designation of the time within which the preliminary statements required by Rule 18 must be filed, and will, *pro forma,* institute and declare the interference by forwarding the notices to the several parties to the proceeding.

11. The notices of interference will be forwarded by the examiner of interferences to all the parties, in care of their attorneys, if they have attorneys, and, if the application or patent in interference has been assigned, to the assignees. When one of the parties has received a patent, a notice will be sent to the patentee and to his attorney of record.

When the notices sent in the interest of a patent are returned to the office undelivered, or when one of the parties resides abroad and his agent in the United States is unknown, additional notice may be given by publication in the Official Gazette for such period of time as the Commissioner may direct.

12. If either party require a postponement of the time for filing his preliminary statement, he will present his motion, duly served on the other parties, with his reasons therefor, supported by affidavit, and such motion should be made, if pos-

sible, prior to the day previously fixed upon. But the examiner of interferences may, in his discretion, dispense with service of notice of such motion.

13. When an application is involved in an interference in which a part only of the invention is included in the issue, the applicant may file certified copies of the part or parts of the specification, claims, and drawings which cover the interfering matter, and such copies may be used in the proceeding in place of the original application.

14. When a part only of an application is involved in an interference, the applicant may withdraw from his application the subject-matter adjudged not to interfere, and file a new application therefor, or he may file a divisional application for the subject-matter involved, if the invention can be legitimately divided: *Provided,* That no claim shall be made in either application broad enough to include matter claimed in the other.

15. An applicant involved in an interference may, with the written consent of the assignee, when there has been an assignment, before the date fixed for the filing of his preliminary statement (see Rule 18), in order to avoid the continuance of

the interference, disclaim under his own signature, attested by two witnesses, the invention of the particular matter in issue, and upon such disclaimer and the cancellation of any claims involving such interfering matter judgment shall be rendered against him, and a copy of the disclaimer shall be embodied in and form part of his specification.

16. When applications are declared to be in interference, the interfering parties will be permitted to see or obtain copies of each other's file-wrappers, and so much of their contents as relate to the interference, after the preliminary statements referred to in Rule 18 have been received and approved; but information of an application will not be furnished by the office to an opposing party, except as provided in Rules 5 and 11, until after the approval of such statement.

17. When an application is involved in an interference in part and shows and describes, without claiming a patentable invention claimed by another party thereto, the applicant may, at any time within twenty days after the preliminary statements (referred to in Rule 18) of the parties have been received and approved, on motion duly made, as provided in Rule 61, file an amendment of his ap-

plication duly claiming such invention, and on the admission of such amendment the invention shall be included in the interference. Such motion must be accompanied by the proposed amendment, and when in proper form will be transmitted by the examiner of interferences to the primary examiner for his determination. In case the amendment shall be admitted, the primary examiner will redeclare the interference, prepare new notices, and forward the papers and files to the examiner of interferences, who will proceed in accordance with Rule 11. The decision of the primary examiner will be binding upon the examiner of interferences, unless reversed or modified on appeal, as provided in Rule 32.

18. Each party to the interference will be required to file a concise preliminary statement, under oath, on or before a date to be fixed by the office, showing the following facts:

(1) The date of original conception of the invention set forth in the declaration of interference.

(2) The date upon which a drawing of the invention was made.

(3) The date upon which a model of the invention was made.

(4) The date upon which the invention was first disclosed to others.

(5) The date of the reduction to practice of the invention.

(6) A statement showing the extent of use of the invention.

If a drawing or model has not been made, or if the invention has not been reduced to practice or disclosed to others, or used to any extent, the statement must specifically disclose these facts.

When the invention was made abroad the statement should set forth:

(1) That applicant made the invention set forth in the declaration of interference.

(2) Whether or not the invention was ever patented; if so, when and where, giving the date and number of each patent, *the date of publication, and the date of sealing thereof.*

(3) Whether or not the invention was ever described in a printed publication; if so, when and where, giving the title, place, and date of such publication.

(4) Whether or not the invention was ever in-

troduced into this country; if so, giving the circumstances, with the dates connected therewith, which are relied upon to establish the fact.

The preliminary statements should be carefully prepared, as the parties will be strictly held in their proofs to the dates set up therein.

If a party prove any date earlier than alleged in his preliminary statement, such proof will be held to establish the date alleged and none other.

The statement must be sealed up before filing (to be opened only by the examiner of interferences; see Rule 19) and the name of the party filing it, the title of the case, and the subject of the invention indicated on the envelope. The envelope should contain nothing but this statement.

19. The preliminary statements shall not be opened to the inspection of the opposing parties until each one shall have been filed, or the time for such filing, with any extension thereof, shall have expired, and not then unless they have been examined by the proper officer and found to be satisfactory.

Any party in default in filing his preliminary statement shall not have access to the preliminary

statement or statements of his opponent or opponents until he has either filed his statement or waived his right thereto, and agreed to stand upon his record date.

20. If, on examination, a statement is found to be defective in any particular, the party shall be notified of the defect and wherein it consists, and a time assigned within which he must cure the same by an amended statement; but in no case will the original or amended statement be returned to the party after it has been filed. *Unopened statements will be removed from interference files and preserved by the office, and in no case will such statements be open to the inspection of the opposing party without authority from the Commissioner.* If a party shall refuse to file an amended statement, he will be restricted to his record date in the further proceedings in the interference.

21. In case of material error arising through inadvertence or mistake, the statement may be corrected on motion (see Rule 61), upon showing to the satisfaction of the Commissioner that the correction is essential to the ends of justice. The motion to correct the statement must be made, if possible, before the taking of any testimony, and as

soon as practicable after the discovery of the error.

22. If the junior party to an interference, or if any party thereto other than the senior party, fail to file a statement, or if his statement fail to overcome the *prima facie* case made by the respective dates of application, judgment against such party may be rendered upon the record, and the interference will proceed between the remaining parties. Within the period fixed as a limit of appeal from such judgment, said party may bring any of the motions permitted by the rules, provided he has not waived his right of appeal. The filing of such a motion, noticed for hearing within the limits of appeal, will operate to stay the running of the time so limited until the final determination of the motion.

23. If a party to an interference fail to file a statement, testimony will not be received subsequently from him to prove that he made the invention at a date prior to his application.

24. In original proceedings in cases of interference the several parties will be presumed to have made the invention in the chronological order in which they filed their complete applications for patents clearly illustrating and describing the in-

vention; and the burden of proof will rest upon the party who shall seek to estatblish a different state of facts.

25. The preliminary statement can in no case be used as evidence in behalf of the party making it.

26. Times will be assigned in which the junior applicant shall complete his testimony in chief, and in which the other party shall complete the testimony on his side, and a further time in which the junior applicant may take rebutting testimony; but he shall take no other testimony. If there be more than two parties to the interference, the times for taking the testimony will be so arranged that each shall have an opportunity to prove his case against prior applicants and to rebut their evidence, and also to meet the evidence of junior applicants.

27. Whenever the time for taking the testimony of a party to an interference shall have expired, and no testimony shall have been taken by such party, any senior party may, by motion based on a showing properly verified and served on such party in default, have an order entering judgment against such defaulting party, unless the latter shall, at a day set and not less than ten days after the hearing of the motion, show

good and sufficient cause why the judgment shall not be entered.

28. If either party desire to have the hearing continued, he will make application for such postponement by motion (see Rule 61), and will show sufficient reason therefor by affidavit.

29. If either party desire an extension of the time assigned to him for taking testimony, he will make application therefor, as provided in Rule 62 (4).

30. Motions to dissolve an interference upon the ground that no interference in fact exists, or that there has been such irregularity in declaring the same as will preclude a proper determination of the question of priority, or which deny the patentability of an applicant's claim, or his right to make the claim, should, if possible, be made not later than the twentieth day after the statements of the parties have been received and approved. Such motions, and all motions of a similar character, should be accompanied by a motion to transmit the same to the primary examiner, and such motion to transmit should be noticed for hearing upon a day certain before the examiner of interferences. When in proper form the motion presented will be trans-

mitted by the examiner of interferences, with the files and papers, to the proper primary examiner for his determination, who will thereupon fix a day certain when the said motion will be heard before him upon the merits, and give notice thereof to all parties. If a stay of proceedings be desired, a motion therefor should accompany the motion for transmission.

When the motion has been decided by the primary examiner, if no appeal has been taken therefrom, at the expiration of the time limited for appeal the examiner will return the files and papers, with his decision, to the examiner of interferences. Such decision will be binding on the examiner of interferences unless reversed or modified on appeal. (Rule 32.)

31. All lawful motions, except those mentioned in Rule 30, will be made before and determined by the tribunal having jurisdiction at the time. The filing of motions will not operate as a stay of proceedings in any case. To effect this, motion should be made before the tribunal having jurisdiction of the interference, who will, sufficient grounds appearing therefor, order a suspension of the interference pending the determination of such motion.

32. Appeal may be taken directly to the Commissioner from decisions of the primary examiner on all motions except the following: (1) On motions to dissolve which deny the patentability of applicant's claim; (2) on motions to dissolve which deny the right of an applicant to make the claim; (3) on motions involving the merits of the invention. Decisions on these motions, when appealable, go to the examiners-in-chief, *in the first instance,* and upon such appeals the questions *shall* be heard *inter partes.*

From a decision of the primary examiner affirming the patentability of the claim or the applicant's right to make the same no appeal can be taken.

33. After the interference is finally declared, it will not, except as herein otherwise provided, be determined without judgment of priority founded either upon the testimony, or upon a written concession of priority by one of the parties, signed by the inventor himself (and by the assignee, if any), or upon a written declaration of abandonment of the invention.

34. The examiner of interferences or the examiners-in-chief may, either before or in their decision on the question of priority, direct the attention

of the Commissioner to any matter not relating to priority which may have come to their notice, and which, in their opinion, establishes the fact that no interference exists, or that there has been irregularity in declaring the same (Rule 30), or which amounts to a statutory bar to the grant of a patent to either of the parties for the claim or claims in interference. The Commissioner may, before judgment on the question of priority, suspend the interference and remand the case to the primary examiner for his consideration of the matters to which attention has been directed. From the decision of the examiner appeal may be taken as in other cases. If the case shall not be so remanded, the primary examiner will, after judgment, consider any matter affecting the rights of either party to a patent which may have been called to his attention, unless the same shall have been previously disposed of by the Commissioner.

35. A second interference will not be declared upon a new applicataion for the same invention filed by either party.

36. If, during the pendency of an interference, a reference be found, the interference may be suspended at the request of the primary examiner until

the final determination of the pertinency and effect of the reference and the interference shall then be dissolved or continued as the result of such determination. The consideration of such reference *shall* be *inter partes.*

37. If, during the pendency of an interference, another case appear, claiming substantially the subject-matter in issue, the primary examiner shall request the suspension of the interference for the purpose of aiding said case. Such suspension will be granted as a matter of course by the examiner of interferences if no testimony has been taken. If, however, any testimony has been taken, a notice for the proposed new party, disclosing the issue in interference and the names and addresses of the interferants and of their attorneys, and notices for the interferants disclosing the name and address of the said party and his attorney, shall be prepared by the primary examiner and forwarded to the examiner of interferences, who shall mail said notices and set a time of hearing on the question of the admission of the new party. If the examiner of interferences be of the opinion that the interference should be suspended and the new party added, he

shall prescribe the terms for such suspension. The decision of the examiner of interferences as to the addition of a party shall be final.

38. Amendments to the specification will not be received during the pendency of an interference, except as provided in Rules 14, 15, 17.

39. When, on motion duly made and upon satisfactory proof, it shall be shown that, by reason of the inability or refusal of the inventor to prosecute or defend an interference, or from other cause, the ends of justice require that an assignee of an undivided interest in the invention should be permitted to prosecute or defend the same, the Commissioner may so order.

40. Whenever an award of priority has been rendered in an interference proceeding by any tribunal and the limit of appeal from such decision has expired, and whenever an interference has been terminated by reason of the written concession, signed by the applicant in person, of priority of invention in favor of his opponent or opponents, the primary examiner shall advise the defeated or unsuccessful party or parties to the interference that their claim or claims which were so involved in the issue stand finally rejected.

APPEALS.

41. Every applicant for a patent, any of the claims of whose application have been twice rejected for the same reasons, upon grounds involving the merits of the invention, such as lack of invention, novelty, or utility, or on the ground of abandonment, public use or sale, inoperativeness of invention, aggregation of elements, incomplete combination of elements, or, when amended, for want of identity with the invention originally disclosed, or because the amendment involves a departure from the invention originally presented; and every applicant for the reissue of a patent whose claims have been twice rejected for any of the reasons above enumerated, or on the ground that the original patent is not inoperative or invalid, or if so inoperative or invalid that the errors which rendered it so did not arise from inadvertence, accident, or mistake, may, upon payment of a fee of $10, appeal from the decision of the primary examiner to the examiners-in-chief. The appeal must set forth in writing the points of the decision upon which it is taken, and must be signed by the applicant or his duly authorized attorney or agent.

42. There must have been two rejections of the claims as originally filed, or, if amended in matter of substance, of the amended claims, and all the claims must have been passed upon, and all preliminary and intermediate questions relating to matters not affecting the merits of the invention settled, before the case can be appealed to the examiners-in-chief.

43. Upon the filing of the appeal the same shall be submitted to the primary examiner, who, if he find it to be regular in form, shall, within *five* days from the filing thereof, furnish the examiners-in-chief with a written statement of the grounds of his decision on all the points involved in the appeal, with copies of the rejected claims and with the references applicable thereto. The examiner shall at the time of making such statement furnish a copy of the same to the appellant. If the primary examiner shall decide that the appeal is not regular in form, a petition from such decision may be taken directly to the commissioner, as provided in Rule 53.

44. The appellant shall, before the day of hearing, file a brief of the authorities and arguments on which he will rely to maintain his appeal.

45. If the appellant desire to be heard orally before the examiners-in-chief, he will so indicate when he files his appeal; a day of hearing will then be fixed, and due notice of the same given him.

46. In contested cases the appellant shall have the right to make the opening and closing arguments, unless it shall be otherwise ordered by the tribunal having jurisdiction of the case.

47. (*a*) The examiners-in-chief in their decision will affirm or reverse the decision of the primary examiner only on the points on which appeal shall have been taken. (See Rule 41.) Should they discover any apparent grounds not involved in the appeal for granting or refusing letters patent in the form claimed, or any other form, they will annex to their decision a statement to that effect, with such recommendation as they shall deem proper.

(*b*) From an adverse judgment of the primary examiner on points embraced in the recommendation annexed to the decision, appeal may be taken on questions involving the merits to the board of examiners-in-chief and on other questions to the Commissioner as in other cases.

(*c*) The Commissioner may, when an appeal from the decision of the examiners-in-chief is taken

to him, remand the case to the primary examiner, either before or after final judgment, for consideration of any amendment or action which may be based on the recommendation annexed to the decision of the examiners-in-chief.

(*d*) If the Commissioner, in reviewing the decision of the examiners-in-chief, discovers any apparent grounds for granting or refusing letters patent not involved in the appeal, he will, before or after final judgment, and whenever in his opinion substantial justice shall require it, give reasonable notice thereof to the parties; and if any amendment or action based thereon be proposed, he will remand the case to the primary examiner for consideration.

(*e*) From the decision of the primary examiner, in cases remanded as herein provided, appeal will lie to the board of examiners-in-chief, or directly to the Commissioner, as in other cases.

48. From the adverse decision of the board of examiners-in-chief appeal may be taken to the Commissioner in person, upon payment of the fee of $20 required by law.

49. If affidavits be received after the case has been appealed, the application will be remanded to the primary examiner for reconsideration.

50. Cases which have been heard and decided by the Commissioner on appeal will not be reopened except by his order; cases which have been decided by the examiners-in-chief will not be reheard by them, when no longer pending before them, without the written authority of the Commissioner; and cases which have been decided by either the Commissioner or the examiners-in-chief will not be reopened by the primary examiner without like authority, and then only for the consideration of matters not already adjudicated upon, sufficient cause being shown.

51. Contested cases will be regarded as pending before a tribunal until the limit of appeal, which must be fixed, has expired, or until some action has been had which waives the appeal or carries into effect the decision from which appeal might have been taken.

Ex parte cases decided by an appellate tribunal will, after decision, be remanded at once to the primary examiner, subject to the applicant's right of appeal, or such action as will carry into effect the decision, or for such further action as the applicant is entitled to demand.

52. Cases which have been deliberately decided

by one Commissioner will not be reconsidered by his successor except in accordance with the principles which govern the granting of new trials.

53. Upon receiving a petition stating concisely and clearly any proper question which has been twice acted upon by the examiner, and which does not involve the merits of the invention claimed, or the rejection of a claim, and also stating the facts involved and the point or points to be reviewed, an order will be made fixing a time for hearing such petition by the Commissioner, and directing the examiner to furnish a written statement of the grounds of his decision upon the matters averred in such petition within *five days after being notified of the order fixing* the day of hearing. The examiner shall at the time of making such statement furnish a copy thereof to the petitioner. No fee is required for such a petition.

54. In interference cases parties have the same remedy by appeal to the examiners-in-chief, to the Commissioner, and to the court of appeals of the District of Columbia, as in *ex parte* cases.

55. Appeals in interference cases must be accompanied by brief statements of the reasons therefor. Parties will be required to file six copies of

printed briefs of their arguments, the appellant five days before the hearing and the appellee one day.

56. From the adverse decision of the Commissioner upon the claims of an application and in interference cases, an appeal may be taken to the court of appeals of the District of Columbia in the manner prescribed by the rules of that court.

57. When an appeal is taken to the court of appeals of the District of Columbia, the appellant will give notice thereof to the Commissioner, and file in the Patent Office, within forty days, *exclusive of Sundays and holidays,* from the date of the decision appealed from, his reasons of appeal specifically set forth in writing.

58. *Pro forma* proceedings will not be had in the Patent Office for the purpose of securing to applicants an appeal to the court of appeals of the District of Columbia.

HEARINGS AND INTERVIEWS.

59. Hearings will be had by the Commissioner at 10 o'clock a. m., and by the board of examiners-in-chief and the examiner of interferences at 1 o'clock p. m., on the day appointed, unless some other hour be specially designated. If either party in a con-

tested case, or the appellant in an *ex parte* case, appear at the proper time, he will be heard. After the day of hearing, a contested case will not be taken up for oral argument except by consent of all parties. If the engagements of the tribunal having jurisdiction are such as to prevent the case from being taken up on the day of hearing, a new assignment will be made, or the case will be continued from day to day until heard. Unless it shall be otherwise ordered before the hearing begins, oral arguments will be limited to one hour for each party in contested cases, and to one-half hour in other cases. After a contested case has been argued, nothing further relating thereto will be heard unless upon request of the tribunal having jurisdiction of the case; and all interviews for this purpose with parties in interest or their attorneys will be invariably denied.

60. Interviews with examiners concerning applications and other matters pending before the office must be had in the examiners' room at such times, within office hours, as the respective examiners may designate; in the absence of the primary examiners, with the assistant in charge. Interviews will not be permitted at any other time or

place without the written authority of the Commissioner. Interviews for the discussion of pending applications will not be had prior to the first official action thereon.

MOTIONS.

61. In contested cases reasonable notice of all motions, and copies of motion-papers and affidavits, must be served, as provided in Rule 62 (2.) Proof of such service must be made before the motion will be entertained by the office. Motions will not be heard in the absence of either party except upon default after due notice. Motions will be heard in the first instance by the officer or tribunal before whom the particular case may be pending; but an appeal from the decision rendered may be taken on questions involving the merits of the case to the board of examiners-in-chief; on other questions, directly to the Commissioner. In original hearings on motions the moving parties shall have the right to make the opening and closing arguments. In contested cases the practice on points to which the rules shall not be applicable will conform, as near as possible, to that of the United States courts in equity proceedings.

TESTIMONY IN INTERFERENCES AND OTHER CONTESTED CASES.

62. The following rules have been established for taking and transmitting testimony in interferences and other contested cases:

(1) Before the depositions of witnesses are taken by either party due notice shall be given to the opposing party, as hereinbefore provided, of the time when and place where the depositions will be taken, of the cause or matter in which they are to be used, and of the names and residences of the witnesses to be examined, and the opposing party shall have full opportunity, either in person or by attorney, to cross-examine the witnesses. If the opposing party shall attend the examination of witnesses not named in the notice, and shall either cross-examine such witnesses or fail to object to their examination, he shall be deemed to have waived his right to object to such examination for want of notice. Neither party shall take testimony in more than one place at the same time, nor so nearly at the same time that

reasonable opportunity for travel from one place of examination to the other can not be had.

(2) The notice for taking testimony or for motions must be served (unless otherwise stipulated in an instrument in writing filed in the case) upon the attorney of record, if there be one, or, if there be no attorney of record, upon the adverse party. Reasonable time must be given therein for such adverse party to reach the place of examination. Service of such notice may be in either of the following ways: (1) By delivering a copy of the notice to the adverse party or his attorney; (2) by leaving a copy at the usual place of business of the adverse party or his attorney with some one in his employment; (3) when such adverse party or his attorney has no usual place of business, by leaving a copy at his residence, with a member of his family over fourteen years of age and of discretion; (4) transmission by registered letter; (5) by express. Whenever it shall be satisfactorily shown to the Commissioner that neither of the above modes of obtaining or reserving notices is practicable, the

notice may be published in the Official Gazette. Such notice shall, with sworn proof of the fact, time, and mode of service thereof, be attached to the deposition or depositions whether the opposing party shall have cross-examined or not.

(3) Each witness before testifying shall be duly sworn according to law by the officer before whom his deposition shall be taken. The deposition shall be carefully read over by the witness, or by the officer to him, and shall then be subscribed by the witness in the presence of the officer. The officer shall annex to the deposition his certificate showing (1) the due administration of the oath by the officer to the witness before the commencement of his testimony; (2) the name of the person by whom the testimony was written out, and the fact that, if not written by the officer, it was written in his presence; (3) the presence or absence of the adverse party; (4) the place, day, and hour of commencing and taking the deposition; (5) the reading by, or to, each witness of his deposition before he signs the same; and (6) the fact that the officer was

not connected by blood or marriage with either of the parties, nor interested, directly or indirectly, in the matter in controversy. The officer shall sign the certificate and affix thereto his seal of office, if he have such seal. He shall then, without delay, securely seal up all the evidence, notices, and paper exhibits, inscribe upon the envelope a certificate giving the title of the case, the name of each witness, and the date of sealing, address the package, and forward the same to the Commissioner of Patents. If the weight or bulk of an exhibit shall exclude it from the envelope, it shall be authenticated by the officer and transmitted in a separate package, marked and addressed as above provided.

(4) If a party shall be unable to take any testimony within the time limited, and desires an extension for such purpose, he must file a motion, accompanied by a statement under oath setting forth specifically the reason why such testimony has not been taken, and distinctly averring that such motion is made in good faith, and not for the purpose of delay. If either party shall be unable to procure the tes-

timony of a witness or witnesses within the time limited, and desires an extension for such purpose, he must file a motion, accompanied by a statement under oath setting forth the cause of such inability, the name or names of such witness or witnesses, the steps which have been taken to procure testimony, and the dates on which efforts have been made to procure it. (See Rule 61.)

(5) When a party relies upon a caveat to establish the date of his invention, the caveat itself, or a certified copy thereof, must be filed in evidence, with due notice to the opposite party.

(6) Upon notice given to the opposite party before the closing of the testimony, any official record, and any special matter contained in a printed publication, if competent evidence and pertinent to the issue, may be used as evidence at the hearing.

(7) All depositions which are taken must be duly filed in the Patent Office. On refusal to file, the office at its discretion will not further hear or consider the contestant with whom the refusal lies; and the office may, at its discretion, receive and consider a copy of

the withheld deposition, attested by such evidence as is procurable.

63. The pages of each deposition must be numbered consecutively, and the name of the witness plainly and conspicuously written at the top of each page. The testimony must be written upon legal cap or foolscap paper, with a wide margin on the left-hand side of the page, and with the writing on one side only of the sheet.

64. The testimony will be taken in answer to interrogatories, with the questions and answers committed to writing in their regular order by the officer, or, in his presence, by some person not interested in the case, either as a party thereto or as attorney. *But with the written consent of the parties the testimony may be taken stenographically, and the deposition may be written out by other persons in the presence of the officer.*

Where testimony is taken stenographically, a long-hand or typewritten copy shall be read to the witness, or read over by him, as soon as it can be made, and shall be signed by him as provided in paragraph 3 of Rule 64. No officer who is connected by blood or marriage with either of the parties, or interested, directly or indirectly, in

the matter in controversy, either as counsel, attorney, agent, or otherwise, is competent to take depositions, unless with the written consent of all the parties.

65. By leave of the Commissioner, first obtained, testimony taken in an interference proceeding may be used in any other or subsequent interference proceeding, so far as relevant and material, subject, however, to the right of any contesting party to recall witnesses whose depositions have been taken, and to take other testimony in rebuttal of the depositions.

66. By leave of the Commissioner, first obtained, testimony may be taken in foreign countries, upon complying with the following requirements:

(1) Such permission will be granted only upon motion duly made. (See Rule 61.) The motion must designate a place for the examination of the witnesses at which an officer duly qualified to take testimony under the laws of the United States in a foreign country shall reside, and it must be accompanied by a statement under oath that the motion is made in good faith, and not for purposes of delay or of vexing or harassing any party to the

case; it must also set forth the names of the witnesses, the particular facts to which it is expected each will testify, and the grounds on which is based the belief that each will so testify.

(2) It must appear that the testimony desired is material and competent, and that it can not be taken in this country at all, or can not be taken here without hardship and injury to the moving party greatly exceeding that to which the opposite party will be exposed by the taking of such testimony abroad.

(3) Upon the granting of such motion, time will be set within which the moving party shall file in duplicate the interrogatories to be propounded to each witness, and serve a copy of the same upon each adverse party, who may, within a designated time, file, in duplicate, cross-interrogatories. Objections to any of the interrogatories or cross-interrogatories may be filed at any time before the depositions are taken, and such objections will be considered and determined upon the hearing of the case.

(4) As soon as the interrogatories and cross-in-

terrogatories are decided to be in proper form, the Commissioner will cause them to be forwarded to the proper officer, with the request that, upon payment of, or satisfactory security for, his official fees, he notify the witnesses named to appear before him within a designated time and make answer thereto under oath; and that he reduce their answers to writing, and transmit the same, under his official seal and signature, to the Commissioner of Patents, with the certificate prescribed in Rule 62 (3).

(5) By stipulation of the parties the requirements of paragraph 3 as to written interrogatories and cross-interrogatories may be dispensed with, and the testimony may be taken before the proper officer upon oral interrogatories by the parties or their agents.

(6) Unless false swearing in the giving of such testimony before the officer taking it shall be punishable as perjury under the laws of the foreign state where it shall be taken, it will not stand on the same footing in the Patent Office as testimony duly taken in the United States; but its weight in each case will be de-

termined by the tribunal having jurisdiction of such case.

67. Evidence touching the matter at issue will not be considered on the hearing which shall not have been taken and filed in compliance with these rules. But notice will not be taken of merely formal or technical objections which shall not appear to have wrought a substantial injury to the party raising them; and in case of such injury it must be made to appear that, as soon as the party became aware of the ground of objection, he gave notice thereof to the office, and also to the opposite party, informing him at the same time that, unless it should be removed, he (the objector) should urge his objection at the hearing. This rule is not to be so construed as to modify established rules of evidence, which will be applied strictly in all practice before the office.

68. The law requires the clerks of the various courts of the United States to issue subpœnas to secure the attendance of witnesses whose depositions are desired as evidence in contested cases in the Patent Office.

69. After testimony is filed in the office it may be inspected by any party to the case, but it can not

be withdrawn for the purpose of printing. It may be printed by someone specially designated by the office for that purpose, under proper restrictions.

70. *Thirty-one* or more printed copies of the testimony must be furnished, five for the use of the office, one for each of the opposing parties, *and twenty-five for the court of appeals of the District of Columbia, should appeal be taken. If no appeal be taken the twenty-five copies will be returned to the party filing them.* The preliminary statement required by Rule 18 must be printed as a part of the record. These copies must be filed not less than ten days before the day of the hearing. They will be of the same size, both page and print, as the Rules of Practice, with the names of the witnesses at the top of the pages over their testimony, and will contain indexes with the names of all witnesses and reference to the pages where copies of papers and documents introduced as exhibits are shown.

When but one of the contestants takes testimony, he may furnish six or more bound type-written copies of the required size.

When it shall appear, on motion duly made and by satisfactory proof, that a party, by reason of poverty, is unable to print his testimony, the print-

ing may be dispensed with; but in such case typewritten copies must be furnished—one for the office and one for each adverse party. Printing of the testimony can not be dispensed with upon the stipulation of the parties.

Briefs in all contested cases shall be submitted in printed form, and shall be of the same size and the same as to page and print as the printed copies of testimony. But in case satisfactory reason therefor is shown to the office, typewritten briefs may be submitted. Briefs shall be filed three days before the hearing, except as provided in Rule 55. By consent of the parties they may be filed later, but in any case must be filed before the hearing. If either party fail to comply with this regulation, no extension of time will be granted for the purpose, except upon consent of the adverse parties.

83. Q. What is meant by the words "on the grounds of abandonment"?

A. An abandoned application is one which has not been completed and prepared for examination within one year after the filing of the petition, or which the applicant has failed to prosecute within one year after any action therein of which notice has

been duly given, or which the applicant has expressly abandoned by filing in the Patent Office a written declaration of abandonment.

84. Q. Can an abandoned case be renewed?

A. Yes; but when a new application has been filed in place of the abandoned or rejected application, a new specification, oath, drawing and fee will be required.

85. Q. What is a forfeited application?

A. A forfeited application is one upon which a patent has been withheld for failure to pay the final fee of $20 within the prescribed time (six months) after the case has been officially allowed.

86. Q. Can a forfeited application be renewed?

A. Yes; when a patent has been withheld for reason of non-payment of the final fee, the inventor may file a renewal application for the same invention, but such second application must be made within two years after the allowance of the original application.

87. Q. Does an application for renewal require a new specification and drawing?

A. No; in such renewal, the oath, petition,

specification, and drawing of the original application may be used for the second application, but a new fee of $15 will be required. The second application, however, will not be regarded for all purposes as a continuation of the original one, but must bear the date from the time of renewal and be subject to examination as did the original application.

88. Q. In what instances would an inventor file in the Patent Office a declaration of abandonment of his pending application?

A. It quite frequently happens that after an inventor files his application and receives the references cited against his invention (if such were his arrangement with his attorney to submit to him the references), many changes and improvements on his own invention suggest themselves to him. Often these changes and improvements are of such a nature as to warrant the abandonment of the case under examination and the filing of a new application in order to embody the new features and improvements therein, also when the invention shown in the drawing is adjudged, by the examiner, to be inoperative or incomplete. No corrections can be made after the application has

been filed unless the errors are either described in the specification or shown in the drawings. It is for the foregoing reasons that the author always advises his clients to have a thorough preliminary examination made of the records at Washington; the inventor has then the state of the art before him and can make any desired changes in his invention before filing the application.

89. Q. Does it pay to invent and pay all costs of the patent application and fees?

A. It certainly does. To show the possibility of making much money out of even a simple idea and the probable reason that many inventors fail to do so, we will follow up the foregoing example of a cool-handle frying-pan. To invent such is apparently a simple matter; it requires no mechanical ingenuity; all one has to do is to think of it. But the one who thinks of it first is, in the eye of the law, the first, sole and original inventor and is entitled to a patent.

90. Q. Is a pan handle such a profitable invention?

A. Yes; it is a very profitable commercial invention, because it performs a useful function; it pre-

vents scorching the fingers. Our housewives will not have their fingers scorched if they can help it; they will buy hollow-handled frying-pans and gladly pay five cents more for them. Out of these five cents the inventor gets a royalty of two cents, and the rest of it goes toward the extra cost of manufacture and the manufacturer's profit of the new addition.

91. Q. Why take a single invention for an example?

A. Primarily, because simple inventions are great stumbling blocks for inventors. It is in simple inventions that the inventors make the greatest errors, as will be demonstrated in the succeeding paragraphs; also for the comprehension of all readers.

92. Q. How is a two-cent royalty invention profitable?

A. Two cents is a very small sum, to be sure, but the fifteen million American families, together with the numberless hotels, restaurants and boarding houses, buy perhaps a hundred million frying-pans every year, and the life of the inventor's patent is seventeen years. The inventor is thus placed

by the Government in a position to make the modest sum of thirty-four million dollars as a reward for his first thinking of the simple invention of a cool-handle frying-pan.

93. Q. Does every inventor make such an immense fortune out of a simple idea?

A. No; not every inventor; some inventors do, but most of them do not.

94. Q. Why do they not?

A. Because, as the Patent Office records show, with the exception of a few, every inventor of a simple idea treats his invention with silly indifference; his aim, apparently, is to obtain any kind of a patent and for as little money as he possibly can. The reason for this is probably because he does not foresee the future possibilities of his simple idea, and doubts whether he can at all obtain a patent for it. The result is that he gets *some kind* of a patent—one that reads a great deal and means nothing. As soon as his invention is published, other inventors and manufacturers in that line who do foresee the possibilities of the idea rush in at once and make numerous modifications of the original inventor's idea, obtain detail patents for

them and flood the market with the improved product. Thus, instead of getting a royalty of two cents, the original inventor gets but a small fraction of a cent, and instead of his manufacturer controlling the market, he is forced to the wall by excessive competition.

95. Q. What should the inventor have done?

A. The inventor should have secured the services of a skilful patent attorney and paid him a certain fee for making a thorough preliminary examination of the Patent Office records at Washington. When the attorney reported that the invention was absolutely new and patentable, the inventor should have made arrangements with the attorney to secure, at any cost, a patent for his invention with the broadest possible claims that the Patent Office would allow. No further patents upon the original idea would have then become possible without liability to the original inventor. Then the thirty-four million dollars, big as it looks, would have been the inventor's reward for his diligence.

96. Q. How broad should the claims for the pan-handle have been made?

A. Every inventor is entitled to claims commensurate with the principle which his invention announces to the world; in other words, he may make his claims as broad as his mental conception. If his invention is some mechanical device which may be made in a large variety of forms and applied to a large number of articles of common use, the inventor is entitled to such changes and applications thereof without enumerating them; but he must make claim to that effect. Every inventor is entitled to make any number of claims commensurate with the principle, construction, effects and functions of his invention he or his attorney is able to draw in accordance with the requirements of the law. The original cool-handle inventor, as we are assuming that he was the first as well as the original inventor thereof, had conceived the idea of a cool handle, and his conception of such entitled him not only to such claims as to secure to him the making of any form of a cool pan-handle, but it also entitled him to such claims as to secure to him the future application of his invention, with all the necessary connections therefor, to such articles as he did not then think of, or even to such as did not then exist, such as, a cool-handle stove-

lid lifter, a cool-handle flat-iron lifter, a cool-handle teakettle; in fact, a cool-handle for any heatable article of use. The application of his handle to such additional articles might have made him more money than twice the amount of royalties he could have collected from the cool-handle frying-pan. These articles are manufactured in large quantities and are used in numbers in every family, and all that he had to do was to claim them for himself. Our patent laws are very favorable to the inventor; they were made for the inventor's benefit. The law is just and true and is willing to give the inventor all that is justly his own. But to get such privileges he must assert his right and make proper claims; if he fails to do so, he alone or his attorney, is to blame for the neglect.

97. Q. How should the pan-handle claims have been worded commensurate with the inventor's conception of the cool pan-handle?

A. The following claims could have been made:

1. A cool handle for a heatable utensil; comprising, a handle of low heat conductivity, and means for engaging the utensil therewith.

2. A cool handle for a heatable utensil, compris-

ing, a handle of low heat conductivity, and means thereon for engagment with the utensil.

3. A cool handle for a heatable utensil, comprising, a handle of low heat conductivity, and means thereon for engaging the utensil thereby.

4. A cool handle for a heatable utensil, comprising a hilt of low heat conductivity, and means at one end thereof for engaging the periphery of the utensil.

5. A cool handle for a heatable utensil, comprising, a hilt of low heat conductivity, and curved engaging means at one end thereof, to distance the heat from the hand.

6. A cool handle for a heatable utensil, comprising, a ventilated handle, and means for engaging the utensil therewith.

7. A cool handle for a heatable utensil, comprising, a ventilated handle, and means for engaging the utensil thereby.

8. A cool handle for a heatable utensil, comprising, a ventilated hilt and means at one end thereof, for engaging the utensil thereby.

9. A cool handle for a heatable utensil, comprising, a ventilated hilt, and means at one end

thereof, for engaging the periphery of the utensil.

10. A cool handle for a heatable utensil, comprising, a ventilated hilt, and curved engaging means at one end thereof, to distance the heat from the hand.

11. A cool handle for a heatable utensil, comprising, an edgeless hilt, to prevent cutting into the fingers, and means for engaging the utensil therewith.

12. A cool handle for a heatable utensil, comprising, a tubular hilt, and means at one end thereof for engaging the utensil thereby.

13. A cool handle for a heatable utensil, comprising, a tubular hilt, and means thereon for engaging the utensil thereby.

14. A cool handle for a heatable utensil, comprising, a tubular hilt, and means at one end for engaging the utesnil thereby.

15. A cool handle for a heatable utensil, comprising, a tubular hilt, and means at one end thereof, for engaging the periphery of the utensil.

16. A cool handle for a heatable utensil, comprising, a tubular hilt, and curved means at one end thereof, to distance the heat from the hand.

17. A heatable utensil with a cool handle for handling same therewith, to prevent scorching the fingers.

18. A heatable utensil, a cool handle for handling same therewith, to prevent scorching the fingers, and an operative connection between said handle and utensil.

19. A heatable utensil, a cool handle for handling said utensil to prevent scorching the fingers, and means upon the handle for engaging the utensil therewith.

20. A heatable utensil, a cool hilt for handling said utensil therewith, to prevent scorching the fingers, and means upon one end of said hilt for engagement with the utensil.

21. A heatable utensil, a cool hilt for handling said utensil therewith, to prevent scorching the fingers, and means upon one end thereof for engaging the periphery of the utensil.

22. A heatable utensil and a tubular handle, to prevent cutting into the fingers, for handling said utensil therewith.

23. A heatable utensil, and a tubular handle, to prevent cutting into the fingers, for handling

said utensil therewith, and an operative connection between said handle and utensil.

24. A heatable utensil, a tubular metal hilt, to prevent scorching the hilt and fingers, for handling said utensil therewith, and means at one end thereof for securing same to the utensil.

25. A heatable utensil, a tubular metal hilt for handling said utensil therewith, and curved engaging means at one end of said hilt, to distance the heat from the hand.

26. The combination of a round hollow frying-pan handle, said handle being made of sheet iron rolled into a tube with the seam turned downward and having one end thereof opened out and flattened said flat end being bent downwardly and having three holes by which it is riveted to the said pan with three rivets, substantially as described.

98. Q. Why, there is but one combination claim in the whole lot! If, as stated in answer to question 64, the combination claims are the all important claims, ought there not to be more than one combination claim in a case so original as this cool handle?

A. That's so; but, you are greatly mistaken; these are all combination claims except the last one,

or claim 26, which is not a combination claim, but a specimen of a "poor claim," a "false claim;" claim 26 does not claim anything. In properly worded combination claims it is not necessary to add the word "combination," it is clearly understood, nor do the words "substantially as described" add to the quality of the claim. Claims 1 to 16 inclusive claim the article proper with such connections as to make the cool handle applicable to any heatable article, and either permanently or temporarily. Claims 17 to 25 inclusive are combination claims of the nature described in answer to question 64, securing to the inventor the use of the article in conjunction with his handle.

In the absence of a definite form of handle, it will be observed that a tubular handle, of the shape of the ordinary coal-shovel handle, riveted to the pan as an ordinary flat handle, is in the claims assumed. When there is a definite form of a handle a few more claims would be necessary to cover the details of its construction.

The 25 claims cover every phase of the invention of a cool handle thoroughly, and each claim is a legal and operative combination. But to secure the allowance of these claims in the Pat-

ent Office and their support in the courts, the specification must lead up to such claims. It will be observed that the 25 claims cover three distinct phases of the invention, viz: 1, A handle of low heat conductivity; 2. A ventilated handle; 3. A tubular handle. The low heat conductivity of the handle must be described in the specification as being the result of the increased surface of the tubular handle through which the heat diffuses itself, leaving the handle cool. The ventilation of the handle must be described, in the specification, as being the effect of its being hollow; the air circulates in the space of the handle and keeps it cool. The tubular handle must be described in the specification, that its preference is mainly because the tubularity of the handle would prevent cutting into the fingers, as the flat handle does, as well as scorching the fingers, but that any other form of a cool handle may be employed.

Similarly, to obtain the sanction of the Patent Office and the Courts to the use of the apparently alternative terms "therewith" and "thereby" in the claims, the specification must state that the handle is, *preferably,* rigidly secured to the periphery of the pan, etc.

99. Q. Does every invention have a future possibility and several phases?

A. Practically every invention has; even the sewing needle and the writing pen have several offsprings, and so has the lucifer match and the tallow candle. To illustrate the importance of considering the future possibilities even of one of the simplest of inventions imaginable, we will take another example. Supposing you were the inventor of the carpet tack and obtained a patent therefor. Your patent, we will say, covered your invention thoroughly, securing to you the exclusive right of making, using and vending a carpet tack. Would that be sufficient? No. Another inventor, after he has seen your tack (for all an inventor needs is to see a promising invention—the impulse to alter and apply it to some other purpose is spontaneous), will cut off the barb and make a rivet out of it, for which there may be a greater demand than for your tack, and make more money out of it than you will of your tack. Still another inventor, after he has seen your tack, will cut off its head and make a shoe peg of it; he, too, will make more money out of his shoe peg than you did out of your tack, and neither of them would infringe upon

your patent, for your patent covers a tack and nothing else (see answer to question 73). The progress of the past century demonstrated the fact that mere protection of the invention proper is insufficient, for it will not remain long in the same state; someone will alter it, and apply it to some other useful purpose, and if such alteration and application is not covered by the first inventor's patent he will not derive the full benefit of his invention.

100. Q. How can the future possibilities of an invention be provided for?

A. The future, as well as the present, possibilities of an invention can be provided for only by the scope and spirit vested in the specification and the claims of the patent. There is only one word of difference between a patent secured by an incompetent attorney and that by a competent. The former secures to the inventor the privileges of making and using his invention, and the latter secures to the inventor the "exclusive" privilege of making and using his invention. This is on a level with one lawyer drawing up a deed by virtue of which the holder of that deed is entitled to enter the property he purchased, and another lawyer

drawing up a deed by virtue of which no person can enter the property without permission from the holder of that deed. This little difference between these two kinds of patents seems to be not very clearly understood by some inventors. As an illustration of the meager knowledge of patents of some inventors I will narrate a little recent incident. I fear that by this I am courting trouble, but as I do not mention the person's name I hope she will be grateful for the reflection rather than indignant, since it is for her edification as well as for that of others.

AN INCIDENT.

One of my friends recommended me to a lady who had an invention; the lady called at my residence and paid me a very high compliment, asserting, smilingly, that I was recommended to her as the best and smartest patent attorney in the world, and that she was told by Mr. So-and-so that I would get her the best patent, and she wanted to have a private talk with me with reference thereto. She showed me her sketch and explained her invention very intelligently. After studying it for a few minutes I told her that first of all the Patent

Office records, will have to be searched to find out whether the improvement was patentable. At this simple remark the lady became indignant and blushed; her face turned crimson red from excitement. "Why," she said, "I have never seen anything like this article, and I am sure no one has ever thought of such an invention before. This is not an improvement but an *invention;* I am positive you could not find one like it in all the world, and if you turned the Patent Office upside down you could not find anything that would do the work as this device does. An examination of the Patent Office records would be a mere waste of your valuable time. This is not an improvement, but an *original invention,"* etc. Noticing that the suggestion of searching the records touched her so deeply, and as I did not yet mention my fee for the preliminary examination, I could not think of any reason for her action, nor how I could have possibly offended her either by that simple remark of searching the records, or by calling her invention an improvement. I was so confused that I did not know what to tell her to pacify her sarcasm, so I tried to divert her attention from the subject by questioning her as to the working of her invention, re-

marking incidentally, by way of apology, that as she had studied her invention thoroughly, she probably knew the state of the art, and that I am accustomed to advise a preliminary examination; for the Patent Office is now 113 years old and the world still older, and that we—patent attorneys—are accustomed to call every invention improvement, etc. Finally she quieted down and asked me what my fee for preparing and prosecuting the case was, and I told her. Here, the lady jumped up from her seat as if scalded. "The idea," she exclaimed, "Why Mr. ——— & Co. never asked me more than ——— and did not say anything about searching the records, and you ask $5 more than they do; why you are doing the work yourself, and they have to pay their men and women clerks for preparing the patents, you ought to do the work for $5 less than they do, not more." I told her that because I am preparing the cases myself I have to charge more, and that I could get her a better patent than Mr. ——— & Co., and that owing to my peculiar aptitude in drawing comprehensive claims my work is well worth $5 more because I would protect her invention thoroughly, not merely get her a patent. "Oh, you can not tell me," said the lady,

"that the Patent Office would give you a better patent than it would Mr. ——— & Co., or some other attorney; *a patent is a patent;* that's only talk; there is no more quality in patents than there is in greenbacks. I have worked three years in the Treasury Department and I know that you could no more get a better patent from the Patent Office than I or any body else could get a better $10 bill in the Treasury Department. *A patent is a patent,* whether you get it out or somebody else." She undoubtedly forgot what she had said before, that she came to me because she thought that I could get her a better patent. I did not care to argue with her much longer. I was exceedingly glad when she left me, for I could see in her face that she plainly accused me of highway robbery, because I was asking $5 more for my superior knowledge and greater painstaking in my work; and though I always try to hold and please all my clients, particularly those referred to me by my friends and clients, I am glad that woman never came back.

I hope that when the student will have carefully studied this book through, he will know that there is quality in patents and a great deal of difference between one patent and another. And so will that

lady, after she has tried to dispose of her patent right.

Inventors, men and women, as a class, are intelligent and well-informed persons, but I have met with many a good inventor who did not seem to understand the difference between a good and a poor patent. For the benefit of such I deem it expedient to make some additional remarks with reference to the importance of securing the broadest kind of patent.

THE PATENT PROPOSITION AND ITS PARALLEL.

The patent proposition is on a parallel with a proposition of this character: The Government is offering to deed to you a building lot in the center of a well-populated city (every class of invention is pretty well populated with patents.) The Government tells you that you can make out your deed for all the ground in that section of the city (class) that is not deeded to another; but that any ground in that lot that you fail to embrace properly in your deed, will be deemed abandoned and set free so that any citizen may use it freely. Under such circumstances, if I should consult you about it and ask you to advise me what to do, you would nat-

urally advice me to employ a good lawyer and see to it that first of all he makes a thorough survey of the land to ascertain just what portion of it is not deeded to another, and then you would say that I should make it my business and see to it that my lawyer draws up a deed that embraces every foot of ground, every nook and corner of that lot that is not deeded to another, for every foot of ground has an intrinsic value. This is just what I am advising every one of my readers to do, and do it well. A building lot in itself, we must remember, is perfectly valueless; its value lies in the size and nature of the structure it is possible to erect thereon from which the returns are expected. And so is an invention; its value lies in the size of trade it is possible to build up thereon against competition. But if you did not care what lawyer you employed, and all you wanted the lawyer to do is to guarantee you that he will get you *a* deed, and that deed which he made out conveys to you but a narrow strip of that building lot, upon which nothing larger than a dog house could be erected, of what value would that deed be to you? This is exactly the case with the patent. The Government gives you the privilege of embracing every principle, effect,

function and detail of your invention; any portion of your invention that is not secured to you by claims is set free so that any person may use it; and hence arises all the supposed infringement suits. The inventor knows that it is his invention and that he has a patent, while the infringer, who has studied the inventor's patent with greater care than the inventor himself, knows that the invention that he is making, though it is the product of the patentee's brain, is set free and therefore he has a legal right to make it. The patentee spends several hundred dollars, and often thousands, in patent litigation and is eventually defeated. This is the cause, perhaps, of the greater number of infringement suits, and in such cases defeat is the patentee's lot.

THE ART OF PREPARING AND PROSECUTING AN APPLICATION.

The art of drawing up a specification and claims and prosecuting an application before the Patent Office properly, is not mastered by every person enrolled in the Roster of Registered Attorneys, just as medical skill is not the property of every doctor holding a diploma. A patent attorney may

be a learned man, a scientist, and a lawyer, and yet be unable to draw comprehensive claims so as to secure to the inventor everything to which he is entitled. The idea of a multiplicity of claims is to hedge around the invention so that no other person could get at the construction, or the principle; the ability to prepare and prosecute such claims is as much of a natural gift as is the inventive faculty. Of course, a proper knowledge of science, law and mechanics is essential, but that alone does not seem to be sufficient.

As previously explained and illustrated, the value of the patent is entirely dependent upon the scope and spirit vested in the specification and the claims of the patent. In original inventions, such as the pan-handle of our example, the drawing up of the specification and the claims properly is practically all that is required. But such inventions are not to be had nowadays, and every application that is filed in the Patent Office must be vigorously prosecuted or no patent worth the having will be the result; for all the broad claims will be rejected on prior patents in the same class. Great skill and ingenuity is required in overcoming references

cited against an invention, and as every argument presented in the defense of the invention remains on record against the invention, the arguments must, therefore, be truthful, yet convincing; otherwise they will be used by the opponent against the patentee. Every invention is usually entirely original with the inventor, but he is seldom, if ever, the first inventor of the entire mechanism; hence, his part of the invention, that is, of which he is the first inventor, must be carefully separated from those that belong to others. Much nicety is required to do this properly, so as to leave the applicant's invention in the shape of a whole, and independent of any of those of his predecessors, not a mere portion of somebody else's machine. The good patent is the one that secures to the inventor the complete whole and leaves no loop holes by which a clever angler may hook a portion of the invention and lay the foundation for a close imitation of the patented article.

Specific, distinct and operative claims, with as few elements as it is possible to make legal operative combinations, and a large number of such claims, is the only kind of patent worth the having and the only one that is profitable. A patent short

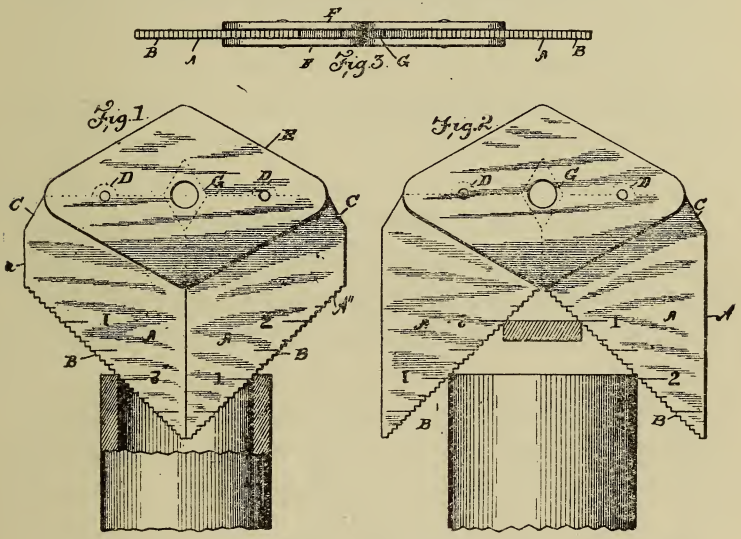
of such qualifications is worse than useless. It is a pity to see so many promising inventions ruined; we often see a patent illustrated by half a dozen sheets of drawings described in about a half dozen or more pages and having but about a half dozen claims, each of which is a small specification in itself, and often so elastic as to make it practically valueless. Such claims read a great deal but mean little or nothing. These patents usually permit the inventor to make his own invention but do not effectually prevent others from making the same thing just a little different. As stated, a large number of properly-drawn claims is important to the successful protection of the invention, and is usually possible if there is any novelty in the invention, and if there is none the patent is not worth the having. Each properly-drawn claim in a patent secures to the inventor a MODIFIED construction of his invention; it follows that *the more modifications you secure to yourself the less you leave for others.* This is the only reason why every inventor should demand from his attorney a large number of claims. If you have an invention that is of any value, have it all to yourself; leave no loop holes and no room for another to enter upon your field, for if you do,

you will be sorely disappointed in your expectation of returns from your invention.

A careful inspection of the device shown in the succeeding cut and the claims covering the invention thereof will give you a clear idea of how a limited invention should be claimed to cover all its phases. The cut is a reduced copy of the official drawing, showing a simple little universal gauge which I have devised for inventors' and mechanics' pocket use, the patent for which was issued on October 13, 1903. The gauge consists essentially of but two principal elements, the two graduated angular blades and a yoke in which the two blades are held reversibly. The principle upon which this gauge operates is not broadly new; there are just twelve patents on record cited against this invention; some of these references show a single angular blade having stepped edges for the same purpose, some show angular blades with graduations, and some folding blades having cut away edges, etc.; so that the only thing that is really new in this device is the principle of using two blades to form the salient or the re-entrant angle instead of one; but as this is a commercially desirable feature it was important to protect the invention there-

of in all its phases. The simple idea of splitting the old angular blade in two is thus protected by twenty claims, preventing twenty different people from making twenty different modifications of my idea of splitting the old angular blade in two. The stepped edges being of little or no commercial value —having been shown and described merely as a substitute for the graduation marks—are not claimed broadly nor made an effective element of the important claims.

In many cases it is advisable to show, describe and claim a modified construction or a substitute function of the invention, and this is often possible. But, as only one invention can be covered in one application, the modified structure or substitute function should not be a broad departure from the principle of the preferred form of the invention. If the modified construction is decidedly different from the preferred form of the invention a new application should be made therefor, even if the new modification is not commercially desirable. Many valuable inventions have been lost to their inventors through unclaimed modifications, and unless the modification can be legally covered in the same application it is best omited.



1. A gage comprising a plate, oppositely-disposed pivots held fixedly thereon, and two angular blades held reversibly upon said pivots to form jointly a salient or a re-entrant angle, to gage the inner or outer squareness of rectangular objects.

2. A gage comprising oppositely-disposed angular blades, means for holding the blades reversibly to form jointly a salient or a re-entrant angle, and means for controlling the two ends of said blades to form correct vertexes.

3. A gage comprising oppositely-disposed angular blades, means for holding the blades reversibly to form jointly a salient or a re-entrant angle, and graduation-marks along those edges of said blades which form said angles, for the purpose specified.

4. A gage comprising a plate, oppositely-disposed pivots thereon, angular blades held reversibly upon said pivots, to form jointly a salient or a re-entrant angle, and means upon said plate for controlling the free ends of the blades, to form correct vertexes.

5. A gage comprising two angular blades each having one agnle of forty-five degrees, and means for holding said blades reversibly to form jointly a salient or a re-entrant angle of ninety degrees, to gage the squareness of rectangular objects.

6. A gage comprising two contiguously-mounted angular blades each having one angle of forty-five degrees, a plate, pivots upon said plate upon which said blades are held reversibly, and means upon said plate for controlling the vertexes of the blades, to form jointly a salient or a re-entrant angle of ninety degrees.

7. A gage comprising two angular blades each of which has a long edge and a short edge parallel

thereto, a plate and pivots thereon, said blades being held contiguously and reversibly upon said pivots, to form jointly a salient angle when the long edges contact or a re-entrant angle when the short edges contact.

8. A gage comprising two angular blades, means for holding the blades reversibly, to form jointly a salient or a re-entrant angle, and a device intermediate between the two blades for controlling the two ends of said blades, to form correct vertexes.

9. A gage comprising a plate, oppositely-disposed pivots thereon, two angular blades journaled upon said pivots, and a block upon said plate against which said blades impinge, to control the vertexes of said blades to form jointly correct vertexes.

10. A gage comprising a plate, oppositely-disposed pivots thereon, a block intermediate between, and in horizontal alinement with, said pivots, and two angular blades journaled upon said pivots contiguously, the contiguous edges of said blades being in vertical alinement with the center of said block, to form jointly correct vertexes.

11. A gage comprising two blades each of which is cut away from its extreme lower corner toward

the opposite upper corner, and having its upper corner cut away to a certain angle, a plate upon which said blades are held reversibly, and an angular block upon said plate of corresponding angle against which one of the upper corners of each blade impinges, for the vertexes of said blades to form jointly a correct vertex.

12. A gage comprising two contiguously-mounted trapezoidal blades each having one edge oblique to its parallel sides, a plate upon which said blades are held reversibly to form a salient or a re-entrant angle, and graduation-marks along said oblique edges of the blades which form said angles, for the purpose specified.

13. A gage comprising two contiguously-mounted trapezoidal blades, a plate upon which said blades are held reversibly to form jointly a salient or a re-entrant angle, and graduation marks along the oblique edges of said blades, to collectively indicate measurements of objects of various diameters without adjustment, said graduation-marks being at right angles to the straight edges A′ of said blades, to facilitate the reading.

14. A gage comprising two contiguously-mounted trapezoidal blades, a plate upon which said

blades are held reversibly, to form a salient or a re-entrant angle, graduation-marks upon the oblique edges of said blades, and numerals upon each blade for indicating inches or half-inches, said numerals of one blade being in reverse order to those of the other, for the purpose specified.

15. A gage comprising a yoke, and two angular blades held reversibly therein, said yoke being composed of two plates and a block between the two plates to hold them the proper distance apart, for said blades to turn freely to form a salient or a re-entrant angle.

16. A gage comprising two angular blades each of which is cut away from the extreme lower corner toward the opposite upper corner and having its upper corner cut away, and an ear intermediate between the upper corners, a plate, and a block thereon upon which said blades are held reversibly with their cut-away corners impinging against said block.

17. A gage comprising a yoke, said yoke being composed of two plates and a block between, pivots for holding the plates in position, said pivots being in horizontal alinement with said block, and two angular blades having cut-away upper corners

journaled upon said pivots between the two plates with one of the cut-away corners of each blade impinging against said block, to prevent the movement of either blade beyond the vertical central line through said block.

18. A gage comprising two contiguously-mounted blades, each of which has one of its corners cut away and the edge thus formed serrated, to center the object to be measured, and means for holding the blades reversibly, to form a salient or a re-entrant angle.

19. A gage comprising a plate, oppositely-disposed pivots thereon, two angular blades held reversibly upon said pivots, to form a salient or a re-entrant angle and steps upon the edges for the object to be measured to bear against the shoulders of said steps.

20. A gage comprising a plate, oppositely-disposed pivtos thereon, a block intermediate between said pivots, trapeziodal blades, adapted to form collectively a salient or re-entrant angle, journaled upon said pivots and impinging against said block, steps upon the edges of the blades forming the angles, and means upon said blades, in juxtaposi-

tion to the said steps, for indicating the measurement of the objects gaged therewith.

101. Q. Can two or more persons make an invention?

A. Yes, they can; they are termed in law joint inventors and are entitled to a joint patent; but neither of them can obtain a patent for himself for an invention that has been jointly invented by them.

102. Q. Can two or more inventors join in one patent?

A. Independent inventors of distinct and independent improvements, though in the same machine, can not obtain a joint patent for their separate inventions.

103. Q. If one furnishes the money for the patent can he join the inventor in the patent?

A. No, he can not; the fact that one person furnishes the capital and the other makes the invention does not entitle them to an application as joint inventors; but in such cases they may become joint patentees, under certain conditions prescribed by law.

104. Q. What are these conditions?

A. The inventor must assign to the party who furnishes the capital a certain interest in the patent and the assignment must be recorded in the Patent Office; the patent will then be issued to both the inventor and the party who furnished the capital.

105. Q. What is an assignment?

A. Every patent, or an interest in a patent, is assignable in law by an instrument in writing called assignment, the assignee is then entitled to the same privilege under the patent as the inventor himself. This instrument is usually made out and recorded in the Patent Office by a patent attorney. Following are the various forms of assignments which the student may copy, fill up and execute, and then submit it to a patent atorney for recording.

ASSIGNMENTS

OF AN ENTIRE INTEREST IN AN INVENTION BEFORE THE ISSUE OF LETTERS PATENT.

Whereas I, ..., of ....., county of ....., and State of ....., have invented a certain new and useful improvement in....., for which I am about to make application for letters patent of the United States; and whereas .....

....., of ..... county ...., and State of ..... is desirous of acquiring an interest in said invention and in the letters patent to be obtained therefor:

Now, therefore, to all whom it may concern, be it known that, for and in consideration of the sum of.... dollars to me in hand paid, the receipt of which is hereby acknowledged, I, the said ...., have sold, assigned, and transferred, and by these presents do sell, assign, and transfer, unto the said ..... the full and exclusive right to the said invention, as fully set forth and described in the specification prepared and executed by me on the .... day of...., 19.., preparatory to obtaining letters patent of the United States therefor; and I do hereby authorize and request the Commissioner of Patents to issue the said letters patent to the said ..... as the assignee of my entire right, title, and interest in and to the same, for the sole use and behoof of the said ..... and his legal representatives.

In testimony whereof I have hereunto set my hand and affixed my seal this ..... day of..... 19....

..... (L. S.)

In presence of—

.....

.....

OF THE ENTIRE INTEREST IN LETTERS PATENT.

Whereas I, ...,of ....., county of...., State of ...., did obtain letters patent of the United States for an improvement in ..... which letters patent are numbered...., and bear date the ....day of...., in the year 19..; and whereas I am now the sole owner of said patent and of all rights under the same; and whereas ...., of ...., county of...., and State of ....., is desirous of acquiring the entire interest in the same:

Now, therefore, to all whom it may concern, be it known that, for and in consideration of the sum of .... dollars to me in hand paid, the receipt of which is hereby acknowledged, I, the said ...., have sold, assigned, and transferred, and by these presents do sell, assign, and transfer unto the said ....., the whole right, title, and interest in and to the said improvement in ..... and in and to the letters patent therefor aforesaid;

the same to be held and enjoyed by the said ...., for his own use and behoof, and for the use and behoof of his legal representatives, to the full end of the term for which said letters patent are or may be granted, as fully and entirely as the same would have been and enjoyed by me had this assignment and sale not been made.

In testimony whereof I have hereunto set my hand and affixed my seal at ...., in the county of .....and State of ...., this ....day of ...., 19....

.....(L. S.)

In the presence of—

.....

.....

OF AN UNDIVIDED INTEREST IN LETTERS PATENT.

Whereas I, ..., of ...., county of.. ....., State of....., did obtain letters patent of the United States for an improvement in ....., which letters patent are numbered...., and bear date the ....day of...., in the year....: and whereas....., of ....., county of ...., State of ....., is desirous of acquiring an interest in the same:

Now, therefore, to all whom it may concern, be it known that, for and in consideration of the sum of .... dollars to me in hand paid, the receipt of which is hereby acknowledged, I, the said ...., have, sold, assigned, and transferred, and by these presents do sell, assign, and transfer unto the said ....., the undivided one-half part of the whole right title, and interest in and to the said invention and in and to the letters patent therefor aforesaid; the said undivided one-half part to be held and enjoyed by the said ...., for his own use and behoof, and for the use and behoof of his legal representatives, to the full end of the term for which said letters patent are or may be granted, as fully and entirely as the same would have been held and enjoyed by me had this assignment and sale not been made.

In testimony whereof I have hereunto set my hand and affixed my seal at..., in the county of... ...., and State of ....., this .... day of...., 19....

..... (L. S.)

In the presence of—

.....

.....

TERRITORIAL INTEREST AFTER GRANT OF PATENT.

Whereas I, ..., of ....., county of ....., State of ....., did obtain letters patent of the United States for improvement in ...., which letters patent are numbered...., and bear date the ....day of.... in the year 19....; and whereas I am now the sole owner of the said patent and of all rights under the same in the below-recited territory; and whereas ....., of ....., county of...., State of....., is desirous of acquiring an interest in the same:

Now, therefore, to all whom it may concern, be it known that, for and in consideration of the sum of ....dollars to me in hand paid, the receipt of which is hereby acknowledged, I, the said ..... have sold, assigned, and transferred, and by these presents do sell, assign, and transfer unto the said ....., all the right, title, and interest in and to the said invention, as secured to me by said letters patent, for, to, and in the State of ...., and for, to, or in no other place or places; the same to be held and enjoyed by the said....., within and throughout the above-specified territory, but not elsewhere, for his own use and behoof, and for the use and behoof of his legal representa-

tives, to the full end of the term for which said letters patent are or may be granted, as fully and entirely as the same would have been held and enjoyed by me had this assignment and sale not been made.

In testimony whereof I have hereunto set my hand and affixed my seal at ...., in the county of ...., and State of....., this...day of....19..

..... (L. S.)

In the presence of—

.....

.....

106. Q. What is a state, shop or county license?

A. The patentee may divide and subdivide his patent right into as many sections as he chooses; he may grant a license to a manufacturer securing him the privilege of making the invention in his shop only, and to another a certain county or State only. The patentee may grant as many licenses and to as many different persons as he chooses. A patent right is as much property as is real estate. The patentee has a right to mortgage his patent right or give the patent as collateral, or do any thing he chooses with it. Following are the various forms of licenses:

LICENSE—SHOP-RIGHT.

In consideration of the sum of..... dollars, to be paid by the firm of ....., of ....., in the county of ..... State of ..... I do hereby license and empower the said ..... to manufacture in said.... (or other place agreed upon) the improvement in ....., for which letters patent of the United States No. .... were granted to me the .... day of ...., in the year 19...., and to sell the machines so manufactured throughout the United States to the full end of the term for which said letters patent are granted.

Signed at...., in the county of.... and State of ...., this .... day of ...., 19....

.....

In presence of—

.....

.....

LICENSE—NOT EXCLUSIVE—WITH ROYALTY.

This agreement, made this..... day of ....., 19...., between ....., of....., in the county of .....and State of....., party of the first part, and ....., of ....., in the county of ..... and State of ...., party of the second part,

witnesseth, that whereas letters patent of the United States No....., for an improvement in..... ....., were granted to the party of the first part on the .... day of ...., 19..; and whereas the party of the second part is desirous of manufacturing.....:..... containing said patented improvement: Now, therefore, the parties have agreed as follows:

I. The party of the first part hereby licenses and empowers the party of the second part to manufacture, subject to the conditions hereinafter named, at their factory in....., and in no other place or places, to the end of the term for which said letters patent were granted, ... containing the patented improvements, and to sell the same within the United States.

II. The party of the second part agrees to make full and true returns to the party of the first part, under oath, upon the first days of .... and .... in each year, of all ..... containing the patented improvements manufactured by them.

III. The party of the second part agrees to pay to the party of the first part.... dollars as license fee upon every ..... manufactured by said party of the second part containing the patented improve-

ments; provided, that if the said fee be paid upon the days provided herein for semiannual returns, or within .... days thereafter, a discount of .... per cent. shall be made from said fee for prompt payment.

IV. Upon a failure of the party of the second part to make terms or to make payment of license fees, as herein provided, for .... days after the day herein named, the party of the first part may terminate this license by serving a written notice upon the party of the second part; but the party of the second part shall not thereby be discharged from any liabilities to the party of the first part for any license fees due at the time of the service of said notice.

In witness whereof the parties above named have hereunto set their hands the day and year first above written at ...., in the county of ...., and State of.....

.....

.....

In the presence of—

.....

.....

107. Q. What is a reissue patent?

A. A reissue patent is granted to the original patentee when the original patent is inoperative or invalid by reason of a defective or insufficient specification; provided, the error has arisen through inadvertance, accident or mistake, and without any fraudulent or deceptive purposes. In other words, when an incompetent attorney secures a shadow of a patent for a real invention the inventor has a remedy, if he happens to detect it soon after the patent is granted, by applying for a corrected or reissued patent.

The reissue application must be made, and the specification sworn to by the inventor, if he is living The petition for a reissue must be accompanied by a certified copy of the abstract of title of the original patent, giving the names of all the persons interested in the patent.

An applicant for a reissue must file a statement on oath, in compliance with certain rules on the subject. Original claims, if reproduced in the reissue specification, are subject to reexamination, and the entire application must be restricted in the same manner as the original application.

The applicant for a reissue patent must sur-

render, or offer to surrender, the original patent when the reissue application is made. The Government fee for a reissue patent is $30; attorney's fees are usually a little more than for original cases. A reissue patent is not looked upon with favor by the courts.

108. Q. What is a design patent?

A. A design patent is a patent for a new, original and ornamental design for an article of manufacture, not known nor used by others. Any person having produced a new design may, upon payment of the required fees and other due proceedings had, obtain a patent therefor.

Patents for designs are granted for the terms of three and one-half years, for seven years, or for fourteen years, as the applicant may in his application elect.

The proceedings in applications for patents for designs are substantially the same as for other patents. The design must be represented by a drawing, made to conform to the rules laid down for drawings for mechanical inventions.

109. Q. What is a caveat?

A. A caveat, under the patent law, is a notice

given to the Patent Office of the caveator's claim as inventor, in order to prevent the grant of a patent to another person for the same alleged invention upon application filed during the life of the caveat without notice to the caveator.

110. Q. Who may file a caveat?

A. Any citizen of the United States (no alien, except one who has declared his intention to become a citizen), who has made a new invention or discovery and desires further time to mature the same, may, upon payment of a fee of $10, file in the Patent Office a caveat, setting forth the object and distinguishing characteristics of the invention, and praying protection of the right until he shall have matured his invention. The caveat is filed in the confidential archives of the Patent Office and preserved in secrecy; it is operative for the term of one year after the filing thereof, but may be renewed from year to year by the payment of a fee of $10 dollars for every year. If the caveat is not renewed, it is still preserved in the secret archives of the Patent Office.

The caveat must comprise a specification, drawing, oath and petition, and like an application for a

patent, must be limited to a single invention or improvement.

A caveat confers no right and offers no protection, except as to notice of an interfering application filed during its life, giving the caveator an opportunity of proving priority of invention. A caveat may be used as evidence in contests.

PART II.

Every intelligent person who by force of circumstances is obliged to seek some new source of remuneration outside of his usual vocation, if such person is of a patient and pensive temperament and of a practical turn of mind, he can find no better field of action than INVENTING. A single invention or a simple improvement, if properly handled may make its inventor independently rich, or at any rate relieve him of a financial embarrasment; such cases are almost of every day's occurrence. The common popular notion that an inventor is different from other persons, in the original constitution of his mind, is a great mistake. The inventor is ordinarily regarded as a rare and peculiar production of nature,—a genius fitted for especial kinds of work and occupied with special kinds of inventions that unfit him for other work. On the contrary, a practical inventor is only a patient, pensive and ambitious worker who trained himself to inventing and is stimulated to action by the natural desire to better his financial condition by the use of his mental powers. Ingenuity is latent, to a greater or less degree, in every rational mind, and like

every other faculty of the human mind, is capable of cultivation, augmentation and development through suitable impulses, instructions and a proper course of exercises. Practically every intelligent person possesses the prerequisite qualifications to inventing and may attain a certain degree of proficiency in conceiving, devising and developing new and improved articles of commerce by a thoughtful and studious perusal of the subject-matter herein presented.

1. Q. There are in this country so many expert mechanics, learned mechanicians, brilliant scientists, and professional inventors. What chance does an ordinary citizen stand to make an invention or improvement worthy of its name in the face of such formidable competition?

A. This question suggests itself to every aspiring inventor who does not happen to be a great mechanic or scientist, and as a result thousands, or perhaps millions, of brilliant minds are detracted from entering the fertile fields of inventing; many become discouraged at the thought of such superiors and drop the project they have already started; others are entirely prevented thereby from testing their mental powers. Let it be remembered that,

notwithstanding all the expert mechanics, learned mechanicians, brilliant scientists and professional inventors, over 25,000 patents are issued every year and most of their inventors are neither expert mechanics, learned mechanicians, brilliant scientists nor professional inventors, but ordinary common-sense men and women who have but a general knowledge, and some, perhaps, little or no knowledge of science or mechanics, or such knowledge as is incident with every intelligent person. Let it further be remembered that expert mechanics, mechanicians, scientists, etc., seldom, if ever, make a commercial invention, or in fact an invention of any kind; they usually busy themselves with experimenting on flying-machines and similar difficult problems which require a profound knowledge of science and mechanics. The prerequisites to inventing is not so much a matter of an appreciable knowledge of science and mechanics as of an observant and reflective mind and a fixed and invincible determination to invent and improve articles and machinery of common use.

The acquirement of a knowledge of science and mechanics is usually the sequel to inventing. Thomas A. Edison, as the records show, possessed

a very meagre knowledge of science and mechanics before he made his first invention, and so it is with every one of the great inventors of the past and the present generations, and in fact of every generation. History tells us that Fulton, the inventor of the steamboat, was an artist, not a machinist; Arkwright, the inventor of the spinning jenny, was a barber; Cartwright, the inventor of the power loom, was a clergyman; and numerous other original inventors can be named to demonstrate the fact that a profound knowledge of science and mechanics, while greatly desirable and unquestionably helpful, is not absolutely essential either to the conception or even to the legal development and reduction to practice of a practical commercial invention. Purpose, not talent, is the essential requirement of a successful inventor.

2. Q. How are inventions made by persons devoid of a knowledge of science and mechanics?

A. Laziness is said to be one parent of invention, and necessity the other. It takes two to make one. When a spirit of laziness encounters a pressure of necessity in a person possessed of an observant, reflective and active mind they beget useful invention. The following allegorical allusion

will illustrate how laziness and necessity propagate useful invention, and incidentally instruct the reader in the principles of inventing; that is, how to find out the result and the means for accomplishing the same; THESE TWO MOVEMENTS CONSTITUTE INVENTING.

A COMMON SENSE INVENTOR.

A farmer born and brought up in the country, without the benefit of an education of any kind, much less science and mechanics, was cutting grass with a scythe the whole of a forenoon. At noon time he, very naturally, felt tired. After disposing of the contents of his dinner pail he felt indisposed to resume his work, so he finally decided to go home and take a rest for the balance of the day and get up early in the morning and do a day and a half's work the next day. The next day it rained and he could not go out to do his work. The thought of the enormous amount of work of removing the grass from the fields when the rainy weather had already set in caused him great mental strain and worry, so he set down wishing. He wished the good Lord would send down His angels and have them cut off the grass for him while he

was sleeping. Then he wished that one of his friends would volunteer to do it for him. These wishes, however, he well knew would not be gratified, for neither his friends will do the work for him nor will the Lord go to the trouble of sending down His angels; so he began to wish there was a machine that could do that kind of work. This wish, too, he knew would not be gratified, for there was then no such machine in existence. Not being able to leave the house, he thought he would make use of his leisure and mend his Sunday clothes, in which he happened to have a rent.

While at work on his clothes cutting off a thread the mechanical action of the scissors attracted his attention and he wished there were large shears to cut the grass with instead of the scythe which tires the arms. He soon dismissed the idea of large shears, for they would be less effective and harder to manipulate, and continued to worry over the large field of grass he had to cut off with the ever-tiring scythe. A few moments later he again picked up the scissors and instinctively compared their action with that of a scythe or a knife, noticing with admiration how infallible the converging blades are in taking in everything in their

path; suddenly an idea flashed across his mind that a large number of small scissors would be more effective than the large shears or a scythe, if there were such a machine in existence. He began to fancy, supposing there was a machine with a large number of little scissors so as to take a long row of grass with little power to work them; would not that be a nice thing? But how is it possible to make a long row of scissors open and shut with but two hands? He dismissed the idea of a multifarious-scissors grass-cutting machine, and resumed his worry about the grass fields and the toilsome scythe, which he heartily despised. After he got through with his mending he thought he would take a tramp over to the railroad station to while away his leisure time there, as is usual with indisposed country men, or even city dwellers. The reciprocating movement of the piston of a slowly approaching locomotive attracted his attention. A few moments of observation of the mechanical action of the reciprocating piston caused him impulsively to exclaim: Why, a large number of little scissors could be operated by a reciprocating bar and by some such movement as that that works the piston! Though he had no idea of

patents and inventions, science and mechanics, and well knew that even if such a machine could be made his grass will now have to be cut off with the scythe, this idea of a large number of little scissors operated by a reciprocatory movable bar weighed heavily upon his mind and he examined the movement of the piston and the action of the eccentric with more than ordinary interest. That day and the succeeding few days the reciprocatory movable piston, its eccentric and the number of little scissors operated thereby, occupied the lazy farmer's mind, and though the inventor had never seen the inside of a machine shop or read a scientific work in his life, this little incident, the consequences of laziness and necessity, gave birth to the mower and reaper, the most valuable time and labor-saving machines of the past and present age.

THE ACTIVITY OF THE MIND.

An active mind draws material from things within its observation, not from books. It is astonishing to see how many ingenious, practical and useful inventions and improvements are being made by women, farmers, fishermen and persons that have practically no knowledge of science and me-

chanics. It is still more astonishing that thousands, or perhaps millions, of our best and most skilful mechanics, mechanicians and scientists, talented and intellectual men and women, live and die in total obscurity, having never made an attempt to make an invention to leave at least a name behind them, if not fame and fortune; probably because their minds and souls are imbued with the erudition from which they can not afford to make a departure. Hundreds of manufacturers and thousands of skilled mechanics have been making the old toothed harrow for centuries; they undoubtedly thought it to be the acme of perfection, and that the thing could not be improved upon, until some country man, perhaps no mechanic, invented the spring harrow, and another the disk harrow, and the third will invent still another form of harrow. And so it is with every line of industry; improvements are usually made by persons having but a slight knowledge of science of mechanics and often even of the operative principles of the thing proper.

The phrase "Laziness is the mother of invention" probably had its origin in the fact that persons possessed of an active mind are often indisposed to do manual work, particularly during the time when

their minds are playing off the overflowing activity, usually attributed by others to a spell of laziness; for active manual labor is practically impossible without the application of the mind. The hands refuse to work without the assistance of the mind. But more likely the phrase had its origin in the fact that when one is most perplexed about the slow and loathsome process of carrying on his work, if such person is of an inventive turn of mind he usually makes the most strenuous effort to devise some means for doing the work easier and faster. In this respect the lazier the person the better his invention. For the simpler an invention the more valuable it is commercially.

VALUABLE COMMERCIAL INVENTIONS.

Time and labor-saving means, devices and machinery are the most valuable commercial inventions, and there is plenty of room for such inventions, waiting for active minds to fill it. The inventor of the rubber tip on the top of the pencil is said to have amassed an immense fortune out of his apparently insignificant invention, but in fact a very useful time-saving means. He was probably too lazy to hunt for his mischievous erasor which

often found its way amongst the books and papers on the desk when it failed in its design to hide itself under the desk, so he conceived the idea of fastening a piece of rubber on the top of the pencil so that it could not get away and is always ready for instantaneous use, thereby saving the time and trouble of hunting for it. Thousands of highly valuable, useful and practical inventions, both large and small, were made and are being made in some such way and under such circumstances without much knowledge of science and mechanics.

The corollary of the foregoing illustrations is: Practice laziness. If you are doing manual work of any kind conclude that the means, devices or machines you are now using are crude and impractical and the process is slow and loathsome, and so they are. They will sooner or later be improved by somebody if you don't get at them. If you do not do manual work yourself watch others working and study their tools, means and machinery and try to improve them so as to make them do more work easier, or with a less number of operations, or easier of manipulation, etc. Scrutinize everything that comes under your observation and try to improve and perfect them. If there is any in-

genuity in you such a course will wake it up, bring it out and excite it to action. Never mind your lack of knowledge of science and mechanics, that will come to you naturally.

INVESTIGATE YOUR MENTAL POWERS.

Let the reader examine himself or herself in the quietude of the night, on retiring, and search for a spark of ingenuity in his or her mental temperament. If you find in yourself an aptitude to devise even the most trifling means for overcoming usual difficulties with which you meet in your regular work your inventive faculty is capable of being developed upon lines herein suggested.

HOW TO ACQUIRE A PRACTICAL WORKING KNOWLEDGE OF SCIENCE AND MECHANICS.

If you aspire to become a practical inventor, you must first learn how to become a practical mechanician; not a theoretical, but a practical mechanician. Book knowledge is good, but it is of little assistance to the practical inventor; the practical inventor must be guided by practical facts, not by theory. Get up some morning early and provide

yourself with an alarm clock and a small screw driver; make one out of a twelve-penny nail if you have none. Wind up the clock slowly and listen to the clicks it makes; try to turn the thumb piece backward. Observe that the clicking part does not yield, but the thumb piece unscrews. Stop for a few moments and guess what makes the thing click and turn one way and not the other. Watch the differential movement of the hands which when one makes a complete revolution the other makes but one-twelfth part of a revolution. Concentrate your mind on the subject and try to figure it out by what means it does it; guess at it if you can. Of course, it is herein assumed that the reader is not a mechanician and has no knowledge of mechanical movements. Unscrew the cap of the clock and carefully remove the mechanism from out of its casing; never pull, push or force any part that does not come out of its holdings readily, but examine it studiously and search for the thing that is holding it and release it carefully. Examine the entire clock mechanism, the movement of the gearings the oscillatory movement of the balance wheel, the movement of the escapment, and the shape of the palets. Study the motion it imparts and the recoiling action

of the hair-spring; study the ratchet and pawl action of the main-spring that clicks when it is wound up and studiously notice how the main-spring pays out generally at every movement of the balance wheel. Assidiously study, digest and comprehend the entire operative principle of the spring motor, or clock work as it is often called, and the differentiation of the hour and minute hands, the alarm mechanism, etc.

Satisfied that you clearly comprehend the operative principle upon which a clock operates, go to work boldly and confidently and dismember the entire mechanism, placing the parts and screws into a saucer or plate and cleaning them with a soft piece of cheese cloth or a handkerchief. Examine the shape and formation of every part, gear and pinion and proceed to reassemble the clock. If you have a pair of tweezers at hand they will come handy, if not, use your fingers instead. You need no other tools than a small screw driver, fingers and a fair stock of common sense. Replace systematically every part just as you remove it. Be cautious and use no other than your brain force to get things into their proper working position. Do not leave your seat until you make the clock work just as it

did before you dismembered it, if not a little better. Oil all bearings, points and journals with a drop of machine oil mixed with a drop of kerosene oil, or a drop of typewriter oil, if you have it. Consult nobody and refuse all offers of assistance from smart friends or brothers in making the clock work satisfactorily; you must do it yourself, assisted by your native ingenuity and self-reliance only. You are sure to make the clock work better than it did before, if you have made up your mind to do it, even if you had never seen a clock before.

Devote another long morning to your sewing machine; observe carefully, thoughtfully and studiously how and by what means the stitches are formed, how and by what means the work is carried along under the pressure foot, step by step, and how, and by what means, the thread is crossed and drawn up exactly in the middle of the texture or between the two plies of material. Always learn to understand the reasons why and what produces such effects and examine the means accomplishing the results. Observe the vertical movement of the needle-bar and find out what sends it up and down alternately. Find out what produces the horizontal reciprocating movement of the shuttle; examine its

co-operative parts; study how it intersects the path of the needle and engages the thread, etc. Then proceed dismembering the machine, cleaning it thoroughly and reassemble it, oiling all bearings and journals. Make the machine work better if you possibly can, but at any rate you must never leave it in an inoperative or imperfect working condition. Devote another morning to the door-lock, and still another morning to the electric bell; learn the reasons why the hammer is attracted and repulsed alternately and in rapid succession when the button is pushed in and ceases when the pressure is released. Carefully dismember the bell and the button. Observe the connections at the battery and the lead of the wires from the push button to one pole of the battery, from the next pole of the battery to one binding post of the bell, and from the second binding post of the bell back to the push button again. Notice the connection at the push button, how the two parts are separated, etc. Next take up some other piece of mechanism you may have in your house, such as a typewriter, piano, music-box, phonograph, gun, pistol, bicycle, carpet-sweeper, or any other piece of electrical or mechanical mechanism within your reach, studying it very carefully,

observing its movements, the cooperation of its many parts, the transmission of motion and learning the operative principles of each and every one of them and the reasons why these things do so and so. Never tamper with any piece of mechanism until you have thoroughly comprehended all its movements and the operative principle of every combination of its parts.

Devote a morning to the study of combustion; take your night lamp and observe the effect of the augumented draft of the chimney upon the wick lamp, observe how the chimney prevents smoking and increases the illumination. Try a piece of metal tubing over your gas jet and observe the contrasted effects. The flame will turn blue and the heat more intensified, due to the admixture of the oxygen of the air of the draft along the tube. Study your blue-flame oil-stove, your gasoline stove and a gasoline torch and make it your business to inspect, investigate and scrutinize everything that comes under your notice in your house, shop or street. By scrupulously following the foregoing instructions the reader will unconsciously acquire a good working knowledge of practical science and mechanics within a few days.

THE INVENTOR'S BUSINESS.

The inventor's business is to condemn everything as crude, imperfect and impractical, no matter how perfect the thing may appear to others. Fifty years ago everything appeared to be perfect and unalterable; these perfect and unalterable things have been improved and altered during the last fifty years perhaps fifty times. Look at the sewing machine, the typewriter or the bicycle of twenty years ago, of ten years ago, or even of one year ago and you will be surprised at their crudeness and imperfection in their early stages; yet the operators and all the people of the world, except inventors, thought them to be most perfect and unalterable then. A few years ago the Caligraph typewriter was considered the most perfect thing and adorned every important office room in the country, but the inventors consigned it to the junk pile; other machines took its place until the inventors got ready for them. Like the country man, who, having heard a shrewd salesman praise up an automobile and convincing the customer that it is the most perfect thing, put in a word and spoiled the game when his employer opened his pocket-

book to pay over the cash for the most perfect machine, asked him incidentally, "What do you think of it, John?" "Well," said John, the country man, "It is all very well, but the machine can not find its way home in the dark as the horses do." So the inventor; to him nothing is perfect and he finds fault with everything. When the Remington, Smith-Premier and other typewriter makers claimed perfection for their machines, the inventor said: "Yes; it is all very well; you have good machines, but the writing can not be seen without lifting up the paper carriage;" and there we have a host of visible writing machines in the market.

HOW THE PROCESS OF PROMOTING THE ARTS THROUGH THE MEDIUM OF THE PATENT IS CARRIED ON.

To the superficial observer the process of promoting the arts and the patent system is a complete mystery. People wonder how it is possible that upon one original invention there are several hundreds of patents and every original invention is made in dozens of different styles. It is all due to our liberal patent laws and the inventor's never-ceasing activity. Howe made one sewing machine;

Singer made a similar sewing machine, but on a different principle. Wheeler and Wilcox made still another machine on still another principle, and so on. Thus we have several dozens of different styles of sewing machines. Professional inventors are always on the alert for something new and produce new principles to gratify the different tastes of the people. When the clever sewing machine inventors have exhausted all the new principles of complete machines possible, and competition between the makers became hot, then the tailors and the women operators took up the task and began to improve upon the construction, operation and manipulation of those machines, and invented attachments, devices and auxiliaries; thus a continuous race for perfection was and is carried on from year to year. There are now perhaps a thousand patents on sewing machines and equally as many, more or less, on practically every commercial invention and the active inventors flourish and prosper and keep on making inventions upon inventions and improvements upon improvements. Thus the handiwork of men is carried along from year to year until perfection will some sweet day be attained, when the millennium will be ushered in

and the world presided over by the ALL PERFECT.

OBSERVATION AND REFLECTION.

Studious observation and reflection are the most powerful impelling forces to invention and discovery. As previously remarked, the aspirant inventor must be a ceaseless observer; he must also reflect upon remarks thrown out by persons or the press and profoundly meditate upon the subject. Many valuable inventions have been made by reflective persons upon reading accounts of robberies, house breaking and safe cracking, devising means and ways for preventing repetitions. The inventor must have his ears as well as his eyes open. When an account of a railroad accident, boiler explosion or fire catastrophe is reported he should endeavor to investigate the cause and devise means for preventing a repetition of the same.

The following few brief, but very interesting, sketches of history of the most important inventions and discoveries in the world, their origin, development and introduction, are introduced with a view to assisting the reader to a clear comprehension of the subject discussed and impressing upon

his mind the importance of close observation of phenomenal effects and reflection upon rumored or reported difficulties with a view to supplying the deficiencies.

HOW THE ART OF PRINTING WAS DISCOVERED.

Laurence Coster, an old warden of the church of St. Bavon, in the quaint old town of Haarlem, Holland, tired of walking around in the woods, set down on the spreading root of some gnarled, old beech. Peeling off a scrap of bark he amused himself with fashioning it into various letters of the alphabet. He learned the practice in bygone days; when a sturdy young fellow he came sighing to the woods, and his knife would carve no letters but those of one loved name; and now, old and solemn, with grizzled head, he liked to sit and cut alphabets for his children's children, to whom he carried them. One day, having shaped the letters with more care and nicety than ordinarily, he wrapped them up in a piece of parchment he had with him. On reaching home and opening the packet, he was surprised to observe the clear and distinct impression which some of the bark letters, moist with sap, had left upon the parchment. This incident re-

vealed to his observant and reflective mind the art of printing. He carved another set of letters, taking care to reverse them so that the impression might give them in their proper position, and dipping one side of them in ink, pressed them upon a piece of parchment. The result was a print, rough and blurred, no doubt, but still nearly as good as the block pictures and block-books which were sold in the shops, and thought a great deal of in those days. And there was this advantage about Coster's contrivance, that he had not to cut out a separate block for each page of sentences, but could arrange and rearrange his letters of bark in any order he liked. Coster soon saw the superiority of his plan over the old-fashioned one, which was very tedious and expensive; and from being the chance amusement of an idle hour printing with letters became the chief and most interesting occupation of his life. The common ink being adapted to spread and leave an ugly blot instead of the outline of the letters, Coster invented a thicker, more glutinous kind of ink, with which he made clear, distinct impressions and could print entire pages, with cuts and characters. He also conceived the idea of forming letters of lead instead of wood, and

afterwards substituted pewter for lead as being harder and more durable. Contriving these expediments and putting them into practice, the old church warden spent his declining years working away at the new art with great earnestness and enthusiasm, in spite of all the foolish, mischievous gossips of ignorant folk in Haarlem who hinted that he must have taken the devil instead of St. Bavon for his patron, or he would never have had a hand in such uncanny work.

JOHN GUTTENBERG.

About the time that the warden of St. Bavon's church was engaged in his first essays at printing, a young pedestrian, with knapsack on his back and staff in his hand, trudged into Haarlem. This was John Guttenberg, of Mayence (or Manz), who had visited the chief places in Italy, Switzerland and Germany, and was on his way through Holland. The son of an aristocratic family, Guttenberg had received the best education of the day; and a man of profound piety, as well as an accomplished scholar, he had, even when a mere youth, deplored the general ignorance of religious matters which prevailed from the scarcity of books.

He regretted that the great truths of religion should be locked up beyond the reach of the multitude in a small number of manuscript books, and ardently cherished the hope that some means might be found of throwing open the treasury to the world, and giving wings to the truths that they might fly to the uttermost parts of the earth.

At Haarlem, Guttenberg made the acquaintance of old Laurence Coster, who with no little exultation disclosed to him the expedient he had hit upon for printing by means of types and showed him a copy of a Latin grammar as the fruit of his invention. Guttenberg had early become convinced that the circulation of literature he so eagerly desired to witness could only be brought about by the substitution of some rapid machine for the slow hand of the transcriber. Whether he had himself made any definite approaches to the contrivance of such a machine is not known; but the sight of Coster's primitive process either inspired him with the new idea on the subject, or spurred him on to carry into practice and to perfect those which had already occurred to him. He now saw his way clearly to the end he held so important, and the next morning, feverishly impatient to commence opera-

tions, he left Haarlem and hurriedly retracted his steps to Strasberg, where on acount of some dispute with the authorities of his native town he had fixed his residence.

Shutting himself up in his own room, seeing no one, rarely crossing the threshold, allowing himself hardly any repose, he set himself to work out the plan he had formed. With a knife and some pieces of wood he constructed a set of movable types, on one face of each of which a letter of the alphabet was carved in relief, and which were strung together in the order of words and sentences, upon a piece of wire. By means of these he succeeded in producing upon parchment a very satisfactory impression.

To be out of the way of prying eyes, he took up his quarters in the ruins of the old monastery of St. Arbogaste, outside of the town which had long been abandoned by the monks to the rats and beggars of the neighborhood; and the better to mask his designs, as well as to procure the necessary funds for his experiments, he set up a sort of artificer in jewelry and metal work, setting and polishing precious stones and preparing Venetial glass for mirrors, which he afterwards mounted in

frames and carved wood. These avowed labors he openly practiced along with a couple of assistants in a public part of the monastery; but in the depths of the cloister, in a dark, secluded spot, he fitted up a little cell, as the *atelier* of his secret operations; and there, secured by bolts and bars and a thick oaken door against the intrusion of any one who might penetrate so far in the interior of the ruins, he applied himself to his great work. He quickly perceived, as Coster had also done by that time, the superiority of letters of metal over those of wood. He invented various colored inks, at once oily and dry, for printing with; brushes and rollers for transferring the ink to the face of the types; "forms," or cases, for keeping together the types arranged in pages; and a press for bringing the inked types and the paper in contact.

Day and night, whenever he could spare an instant from his professional occupations, he devoted himself to the development of his great work. At night he could hardly sleep for thinking of it, and his hasty snatches of slumber were disturbed by agitated dreams.

The enterprise throve; but misfortune was ever dogging Guttenberg's steps, and he had but a brief

taste of prosperity. The priests looked with suspicion upon the new art, which enabled people to read for themselves what before they had to take on trust from them. The transcribers of books—a large and influential guild—were also hostile to the invention which threatened to deprive them of their livelihood. These two bodies formed a league against the printers, and upon the head of poor Guttenberg were emptied all the vials of their wrath.

Such is the traditional history of the first invention of printing with movable types. The story about Laurence Coster comes to us through Hadrian Junius, a Dutch writer of the sixteenth century, who says it was transmitted from one generation to another "as a lighted torch passes from hand to hand without being extinguished," and that he himself had it from men of honor and standing. A fierce controversy, however, rages between the Germans and the Dutch as to the origin of the invention; and there are no means of exactly apportioning the amount of merit respectively due to Coster and Guttenberg.

HOW THE SPINNING JENNY WAS INVENTED.

Arkwright, a poor barber, living in the midst of a manufacturing population, was accustomed to hear daily complaints of the continual difficulty of procuring sufficient weft to keep the looms employed, while the exportation of cotton goods gave rise to a growing demand for the manufactured article. The weavers generally had the weft they used spun for them by their wives or daughters, and those whose families could not supply the necessary quantity had their spinning done by their neighbors; and even by paying, as they had to do, more for the spinning than the price allowed by their masters, very few could procure weft enough to keep themselves constantly at work. It was no uncommon thing, we learn, for a weaver to walk three or four miles in a morning and call on five or six spinners before he could collect weft enough to serve him for the rest of the day. Arkwright must have been hearing constantly of this difficulty, and of the restrictions it placed on the manufacture of cotton goods; and being a mechanical genius, was led to think how it might be lessened, if not got rid of altogether. The idea of having an automaton spinner, instead of one of flesh and

blood, had occurred before then to more than one speculator; but the thing had never answered, and no models or descriptions of the machine proposed were preserved. One inventor had, indeed, destroyed his own machine, after having constructed and found it to work, for fear that if it came into use it would deprive the poor spinners of their livelihood—in reality its effect would have been to provide employment and food for thousands more than at that time got a miserable living from their spinning-wheels.

While Arkwright was intent on the discovery of perpetual motion, he fell in with a clockmaker by the name of Kay, who assisted him in making wheels and springs for the contrivances he was trying to complete. This led to an intimate connection between them; and when Arkwright had given up the perpetual motion affair, and applied his thoughts to the invention of some machines for producing cotton weft more rapidly than by the simple wheel, Kay continued to help him in making models. Arkwright soon became so engrossed in his new task, and so confident of ultimate success, that he began to neglect his regular business. All his thoughts, and nearly all his time, were given

up to the great work he had taken in hand. His trade fell off; he spent all his savings in purchasing materials for models, and getting them put together, and he fell into very distressed circumstances. His wife remonstrated with him, but in vain; and one day, in a rage at what she considered the cause of all their privations, she smashed some of his models on the floor. Such an outrage was more than Arkwright could bear, and they separated.

In 1768, Arkwright, having completed the model of a machine for spinning cotton thread, removed to Preston, taking Kay with him. At this time he had hardly a penny in the world, and was almost in rags. His poverty, indeed, was such, soon after his arrival in Preston, where a contested election his arrival in Preston, where a contested election he was so tattered and miserable in his appearance, that the party with whom he voted had to give him a decent suit of clothes before he could be seen at the polling-booth. He had got leave to set up his machine in the dwelling-house attached to the Free Grammar School; but, afraid of suffering from the hostility of the spinners, as the unfortunate Hargreaves had some time before, he and

Kay thought it best to leave Lancashire and try their fortune in Nottingham.

Poor and friendless, it may easily be supposed that Arkwright found it a hard matter to get anyone to back him in a speculation which people then regarded as hazardous, if not illusory. He got a few pounds from one of the bankers in the town; but that was soon spent, and further advances were refused. Nothing daunted, Arkwright tried elsewhere for help, and at length succeeded in convincing Messrs. Need and Strutt, large stocking weavers in the place, of the value of his invention, and inducing them to enter into partnership with them. In 1769 he took out a patent for the machine, as its inventor, and a mill, worked by horse power, was erected for spinning cotton by the new machine. Two years after, he and his partner set up another mill in Derbyshire, worked by a water wheel; and in 1775 he took out another patent for some improvements on his original scheme.

The machinery which he patented consisted of a number of different contrivances; but the chief of these, and the one which he paticularly claimed entirely as his own invention (for he frankly admitted that some of the other parts were only de-

velopments of other inventors), was what is called the water-frame throstle from drawing out the cotton from a coarse to a finer and harder twisted thread, and so rendering it fit to be used for the warp, or longitudinal threads of the cloth, which were formed of linen, as well as the weft. This apparatus was a combination of the carding and spinning machinery; and the principle of having two pairs of rollers, one revolving faster than the other, was now for the first time applied to machinery.

In a year or two the success of Arkwright's invention was fairly established. The manufacturers were fully alive to its importance, and Arkwright now reaped the reward of all his toil.

HOW THE POWER-LOOM WAS INVENTED.

A number of gentlemen were chatting, after dinner, in a country house at Matlock in Derbyshire. Some extensive cotton mills had recently been set up in the neighborhood, and the conversation turned upon the wonderful inventions which had been introduced for spinning cotton. There were one or two gentlemen present connected with the

"manufacturing interest," who were very bitter against Arkwright and his schemes.

"It's all very well," said one of the grumblers, "but what will all this rapid production of yarn lead to? Putting aside the ruin of the poor spinners who will be starved because they haven't as many arms as these terrible machines, you'll find that it will end in a great deal more yarn being spun than can be woven into cloth, and in large quantities of yarn being exported to the continent, where it will be worked up by foreign weavers, to the injury of our hose manufacture. That will be the short and the long of it; mark my words."

"Well, but, sir," remarked a grave, portly, middle-aged gentleman of clerical appearance, after a few minutes reflection, "when you talk of the impossibility of the weaving keeping up with the spinning, you forget that the machinery may be applied to the former as well as the latter. Why may there not be a loom contrived for working up yarn as fast as the spindle produces it. That long-headed fellow Arkwright must just set about inventing a weaving machine."

"Stuff and nonsense," returned the "practical man" pettishly, as though it were hardly worth

while noticing the remarks of such a dreamer. "You might as well bid Arkwright grow the cloth ready made. Weaving by machinery is utterly impossible. You must remember how much more complex a process it is than spinning, and what variety of movements it involves. Weaving by machinery is a mere idle vision, my dear sir, and shows you know nothing about the operation."

"Well, I must confess my ignorance on the subject of weaving," replied the clergyman; "but surely it can not be a more complex matter than moving the pieces in a game of chess. Now, there's an automaton figure now exhibiting in London, which handles the chess men and places them on the proper squares of the board, and makes the most intricate moves, for all the world as if it were alive. If that can be done, I don't see why weaving should baffle a clever machinist. A few years ago we should have laughed at the notion of doing what Arkwright has done; and I'm certain that before many years are over we shall have 'weaving Johnnies,' as well as 'spinning Jennies.'"

Dr. Cartwright, for that was the clergyman's name, confidently as he foretold that machine-weaving would be devised before long, little

dreamed at that moment that he himself was to bring about the fulfilment of his own prediction. A quiet, country clergyman of literary tastes, a scholar and poetaster, he had spent his life hitherto in the discharge of his ministerial duties, writing articles and verses, and had never given the slightest attention to mechanics, theoretical or practical. He had never so much as seen a loom at work, and had not the remotest notion of the principle or mode of its construction. But the chance conversation at the Matlock dinner table suddenly roused his interest on the subject. He walked home meditating on what sort of a process weaving must be; brooded over the subject for days and weeks—was often observed by his family striding up and down the room in a fit of abstraction, throwing his arms from side to side like a weaver jerking the shuttles—and at last succeeded in evolving, as the Germans would say, from "the depths of his moral consciousness" the idea of a power-loom. With the help of a smith and a carpenter he set machines, and at length, after five or six months' application, turned out a rude, clumsy piece of work, which was the basis of his invention.

"The warp," he says, "was laid perpendicularly,

the reed fell with the force of at least a hundred weight, and the springs which threw the shuttle were strong enough to have thrown a Congreve rocket. In short it required the strength of two powerful men to work the machine at a slow rate, and only for a short time. This being done, I then condescended to see how other people wove; and you will guess my astonishment when I compared their easy modes of operation with mine. Availing myself of what I then saw, I made a loom in its general principles nearly as they are now made. But it was not till the year 1787 that I completed my invention."

Having given himself to the contrivance of a loom that should be able to keep pace in the working up of the yarn with the jenny which produced it, solely from motives of philanthropy, he felt bound, now that he had devised the machine, to prove its utility and bring it into use. To have stopped with the work of invention would, he conceived, have been to leave the work half undone; and therefore, at no slight sacrifice of personal inclination, and to the rupture of all old ties, associations, and ways of life, he quitted the ease and seclusion of his parsonage, abandoned the pursuits

which had formerly been his delight, and devoted himself to the promotion of his invention.

3. Q. What are my chances to invent small, simple things?

A. The state of the art in every branch of industry is now worked up to a very high pitch, so that not very many absolutely new and original inventions, especially small, simple and of general utility, can be expected. Improvement is the order of the age, and there is plenty of room for good improvement. Almost everything now in common use will yield to improvement, and improvements will be made upon improvements until the end of time.

4. Q. Are there not things that can not be improved?

A. Possibly there are; but if they can not be improved they can be altered, which is often equally beneficial, and if not beneficial is profitable anyway. It appears that the most unalterable thing can be altered; for instance, ever since horses have been created and wagons invented, the driver's position was in front of the passengers. Where is his position now? Behind the passengers. A few

years hence his position will probably be over the passengers, and before the world comes to an end we may find him under the vehicle, or in front of the horses, or some place that is a future possibility of which we can not think at present.

5. Q. Is alteration patentable?

A. No; not in itself, but it is patentable with the change of the component parts of the machine or manufacture which must necessarily take place when a thing is altered. Thus, the construction of the elevated seat back of the cab is patentable, and the alteration of the position of the seat is patentable in conjunction with the elements of construction of the seat and the adjoining parts.

6. Q. If a person has conceived an idea of a machine to perform a certain function, but, not being a mechanic, he is unable to work out his idea to make the invention operative and commercially practical, has he a right to employ an inventor to work it out for him?

A. This is a very important question, and to answer it intelligently will require a lengthy reply.

As noted in answer to question 22, an effect or a function is not, as such, a patentable invention.

It therefore follows that if you go to an improver and tell him that you have conceived the idea of running a plow, for instance, without horses, but not being a mechanic you are unable to work it out and want him to do it for you, you have absolutely no claim to the invention if he does work out your idea of a horseless plow and applies for a patent for himself, unless you make a legal contract with him in which he agrees to execute the application papers and assign such an invention to you. Why? Because you had no tangible invention, but an effect, or a function, which in itself is not patentable (see answer to question 13). But if you should go to an improver and tell him that you have conceived the idea that, by mounting a plow on two wheels that are made rigid on an axle, and the axle journaled in bearings formed in the two handles of the polw, and an electric motor mounted between the two handles and geared to the axle so that the rotating of the armature revolves the axle with the wheels and thereby propels the plow, etc.—if the improver worked out your idea and made it operative and practical, you alone would have the right to the invention. This would still hold true even if, in order to make your invention

operative, the improver had to change the location of the motor; or perhaps he could not at all use an electric motor, as you suggested, because he knew that to run the motor it would require a box full of storage batteries, about which you knew nothing, and that it would not be practical to carry along a box of storage batteries with the plow on rough fields and over plowed ground; so he fitted the plow with a gasoline or steam engine. And instead of using gearings as you suggested, he used a belt and pullies, or a chain and sprockets, or a rope to transmit power from the engine to the axle; and although he provided means for lifting the plow out of contact with the ground so that it could be wheeled along from one place to another, of which means you did not think at all. Furthermore, he provided adjustments for different depths in the soil and numerous other little things that were necessary to reduce the invention to a practical and operative form about which you knew nothing, you are, in the eye of the law, the sole and original inventor of that plow, and he, the improver, would have no claim against the invention except for compensation for the work, because your description of the plow was sufficiently tangi-

ble for an expert mechanician to make a working machine of it.

7. Q. Would I be entitled to the changed and additional features, though I did not invent them?

A. Yes; you would be entitled to the changed and additional features, because you conceived the main principle of the machine. The rule of law is that one who empowers another person to make experiments upon his own conception for the purpose of perfecting it in detail, is entitled to the ownership of such improvements in the conception as may be suggested by such other person. The second person is not, in law, to be regarded as an independent and original inventor. The changed features are termed, in law, "equivalents;" they are equivalent to the means you suggested. The additional features, such as the adjustments, the third wheel, etc., the law presupposes that if you were a mechanic you would have invented them yourself; but as you are not, you had a right to employ someone who is proficient in the art to invent them for you, and they are yours.

8. Q. As I am not a mechanic, how am I going

to develop and work out my idea to the point of enabling me to submit it to an improver?

A. I will give you some practical instructions on how to go about it. These instructions apply, of course, to every other kind of machine, device or thing you may conceive. To find out what to invent, or the function it is desirable to accomplish, is, as previously stated, the all-important. After you have conceived the function and know just what tool, machine or implement you wish to devise to accomplish that function, the rest is comparatively easy. Proceed as follows: Get up early in the morning, when your brain is fresh, your head clear, and your body recuperated, and put on your thinking cap. Have a sheet of paper and a pencil before you ready for use, and begin to discuss the matter with your inner self.

Directing your thoughts to the subject, speak to yourself audibly in this manner: "What I wish to accomplish is to substitute some mechanical power for that of a horse to drag the plow along in a straight line." Scrutinizing the effects and functions of the invention you wish to develop, you will say, "Well, then, let me see; what is a plow and what is a mechanical power? I will analyze

the functions of each and then see how the two could be combined so as to perform the new function of a horseless plow and thus dispense with the ever-tiring old horse and use power instead." Ask yourself the question, "What is a plow?" and you will naturally answer, "A plow is nothing more than an iron implement buried in the ground, which by dragging it along the field in a straight line leaves a furrow of a certain depth in the ground." Ask yourself the question, "What is an engine?" and you will answer, "An engine, or other mechanical power, is nothing but an automatically rotating shaft; by belting or gearing the rotary shaft of the power to another rotatable shaft, the power will rotate the latter shaft." Here you will probably say, "But a plow does not have to be rotated, but dragged. The only way I can see to accomplish my object would be to employ a traction engine to drag the plow just as the horse does; but that would never do; for you can not call out to a traction engine as you could to a horse; there would have to be an engineer to guide the engine and a plowman to guide the plow. That will never do. I guess it can not be done and that is why it was not done before. I will give it up."

But wait; do not forget that you are here to do some thinking. Then do what you determined to do.

Every inventor meets with the same fate as you did. After spending an hour or two in profound thinking, and analyzing the functions of the idea he conceived in the manner hereinbefore described, he concludes that his object is unattainable, and that because it can not be done, is the reason why it was not done before. This is simply the effect of the natural, or rather unnatural, inertia of your inventing faculties against which you have to struggle, and which you must face and combat manfully. The machine or horseless plow you are working on would have been carried into effect before, but you were the first one who conceived that idea. Inventing is like finding a thing that was lost; hundreds of persons might have been looking for the same thing and perhaps on the same spot and given it up as lost forever, yet one persistent searcher found it and is therefore entitled to the reward; perhaps not so much for the finding as for his persistency. It is quite possible that hundreds of persons thought that a horseless plow would be a great success, but have never started

to work it out, or perhaps started but abandoned it as you would now. Follow my directions, sir, and see what results persistency will accomplish. Take up your subject with renewed determination to carry your project to a finish, reasoning with yourself earnestly. You will very soon say to yourself this: "A traction engine travels itself; supposing I attach the mould board with its plow share direct to the engine instead of dragging it as a horse does; the man who will guide the engine will guide the plow. But what am I talking about? The plow doesn't need guiding at all. If the plow is rigidly secured to the engine, the plow can not get away. All the man will have to do will be to guide the engine in a straight line; the plow can not help making a straight furrow. Well, that seems to be all right, but a traction engine is a very troublesome, costly and clumsy thing. An ordinary plow boy could not manage a steam engine very well; it would require an engineer. An electric motor would be just the thing for that purpose. It is light, easy to manage, and it doesn't cost as much; but an electric motor can not travel itself, as a steam engine does."

Get up and pace the floor a few minutes with

your mind still bent on the electric motor. Say, "No; nothing else will do; I must apply an electric motor to my plow." Then resume your thinking. Reason with yourself and criticise the practicability of every idea that suggests itself. The process is slow but sure. Go about it systematically, as previously suggested, and do not let your mind wander away from your subject or let any thought enter your mind that your object is unattainable. Iterate and reiterate that an electric motor would do the work nicely and that it can be done and it must be done. Your intense concentration of mind on the subject, and your conclusion that an electric motor would be the only suitable power for that purpose, and that there must be a way of applying a motor to that purpose, and that there must be a way of applying the motor to drag a plow, will take you back to your analysis of mechanical powers. Reason will whisper in your ear and you will say to yourself that "Since an electric motor, like a steam engine, is nothing but a rotary shaft, it is evident that by mounting the motor on wheels, the motor would rotate the wheels just as the traction engine does. Now if a plow should be attached to the axle of those wheels

which are propelled by the motor, the motor will propel the plow just as a traction engine would."

You will now become enthusiastic over your invention. You will have before your mind's eye a fairly good picture of a horseless plow propelled by a neat little electric motor. "This plow," you will say, "could easily be managed by a plowman; to start it, all he would have to do would be to touch a button or close the switch," but a few minutes later you may again become discouraged and you will reason with yourself thus: "To gear the motor to the four wheels will make the machine clumsy and expensive; and then, how on earth am I going to gear the motor to the four wheels, or even to two wheels only, if that could be done? and to what shall I attach the mould board?" etc. Don't let up for a minute. Make up your mind once and forever that you must work out this machine, come what may, even at the expense of missing your breakfast, your dinner, and even your supper that day; it must be done, and it must be done to-day. A few minutes of intense concentration of mind on the subject, and an idea is sure to flash into your mind. You will wake up as from a trance and say: "Why, I can make the thing run

on two wheels only, and make the two wheels rigid upon the axle and then gear the motor to the axle instead of to the wheels. That certainly is a great improvement over the idea of gearing the motor to the four wheels, or even to two wheels. Now I am all right; so far so good. But where shall I place the plow? I think in front of the wheels, just about in the middle between the two wheels, would be the best place, because the pressure upon the plow would be evenly distributed; and, let me see, as I don't need any more than two wheels for that plow, I can have a little wheel at some convenient point near the mould board that would do to gauge the depth of the plow share in the soil, to prevent the plow from burying itself too deep into the soil, and to wheel the plow about the fields. So far I am all right, sure enough; but how am I going to connect the mould board to the wheels? Why this is easy; I will just remove the ordinary wooden handles from the plow and bolt on two iron arms to the beam. These I will spread out so that the space between them is equal to the length of the axle between the two wheels, and to the ends of these arms I will bolt on two bearing boxes, or perhaps, I will just bend the forward ends

so as to embrace and hold the axle revoluble in them."

Within two or three hours of profound thinking you will have a fairly good idea of the horseless plow you wish to create. As soon as you have the general outline of the plow in your mind, sketch it out so that you will be able, at least, to identify the parts of the plow, axle and wheels, even though you can not make a good sketch. Having gone so far, here is where you are apt to again become discouraged. You will say to yourself, "As I am not an electrician and have not the slightest idea of how electric motors are built, how am I going to sketch an electric motor and connect it with the axle?" Well, don't get discouraged; just make a square or cylinder to represent the motor (see sketch) and have a shaft projected from that square or cylinder; next run two parallel lines from that shaft to the axle and make a series of cross lines that will make the two lines appear like a step ladder; these will represent the gear teeth of the gearing. You will now have a fairly good sketch from which a good improver could make out the details, and a practical patent attorney could prepare the case for the Patent Office.

These instructions are not mere conjectures or theorems, but a practical course of procedure such as I myself pursue and one which is practiced by all practical inventors, and you can take them for all they are worth to you.

Remember, now, the essential steps to be taken: 1. Analyze the functions of the idea you wish to reduce to practice, also the functions of the old or existing machinery upon which you are improving; 2. Criticise every idea that suggests itself; 3. Hold your mind concentrated upon the subject, and talk to yourself audibly, as if you were talking to some person who is advising you to employ a certain mechanical means to accomplish a certain function and tell him (your own self) no, that won't do, it will be too costly to make, it will look too clumsy, or it will be too heavy, complicated or intricate to manage, etc; 4. Be determined not to leave the room until you have a fairly good picture of your invention that looks to you practical; revolve your ideas in your mind and look at your sketch every few minutes until you are satisfied that it is the best you can do.

Another important point worthy of close attention is, that when you have conceived an idea of

accomplishing a certain function, do not start to work at it at once, but revolve it in your mind several days and consider the commercial end of it. When you are satisfied that your scheme, if carried out successfully, will be a commercial success, then work away as suggested and bring your project to a finish. Follow these instructions faithfully, and if you do not make a success of your first, second or third invention, do not get discouraged, but work away until you hit upon something good, and you are sure to hit it some day, if you persevere.

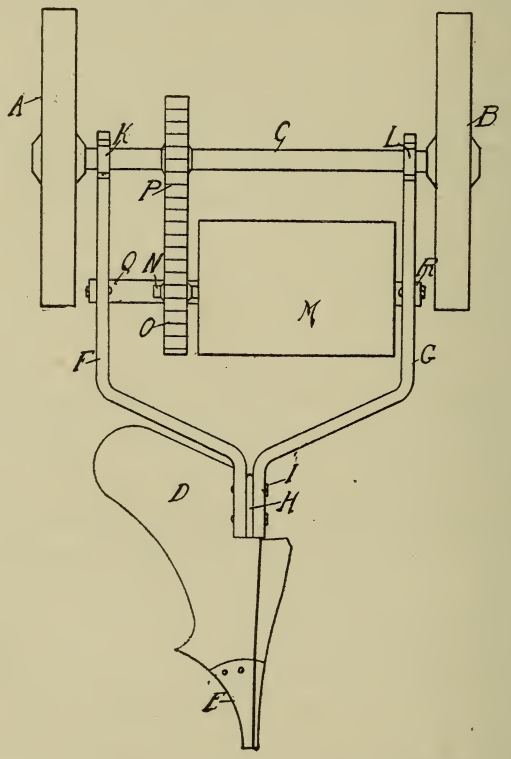
9. Q. No doubt, by following the foregoing instructions I would be able to reduce an idea to a practical form and make a fairly good sketch thereof. But suppose I should send the sketch to an improver, and ask him to work it out for me; if he sees it is a good thing, he might work it out and get out a patent for himself. What could I do if he should deny the fact that I sent him a sketch and disclosed to him my invention?

A. This is extremely unlikely to happen, for the person would subject himself to imprisonment; but to guard you against such remote possibilities I will give you further instructions, which will be

useful for other purposes as well and prevent possible complications.

Carefully review the sketch again and again several times and see if the machine or thing you were working on is as good as you can make it. Try to supply all the deficiencies yourself if you possibly can. Then write a letter to the person to whom you are going to send the sketch, telling him the objects of your invention and all the advantages you think your invention possesses over others in that line; then explain the sketch to him minutely, referring to it by letters in this manner: "*A* is supposed to be one wheel of the horseless plow." Here make a stroke or leader, as it is called, from the letter *A* to the wheel (see sketch). "*B* is the second wheel, *C* the axle upon which the two wheels are rigidly secured so as to revolve with the wheels, *D* is the mould board, *E* the plow share," etc. Mark the letters upon the sketch as you write the letter, and proceed marking every line or dot that appears on your sketch that has any meaning, explaining what such a line or dot represents. Write freely and fully, without frills, just as if you were telling the news of your invention of a horseless plow to your brother and tried

to make him understand the invention shown in the sketch. When the description is finished, make an exact duplicate thereof and an exact duplicate of your sketch. Place one sketch and one description into an envelope and seal it. Take the sealed envelope to the post-office and put a ten-cent stamp on it and address it to yourself; have it registered and mailed to you. Next morning when you get the envelope containing your sketch and description, be sure you don't open it, but put it away for safe keeping. The post-office stamp upon the envelope lap makes this document an efficient evidence in matters of controversy. The second sketch and description should be submitted to a competent patent attorney first, or, if you wish to send them to me, enclose them in an envelope with a five dollar bill for a thorough preliminary examination of the patent records and address the envelope thus: "C. S. Labofish, Washington, D. C." Have it registered and mailed to me. Keep the receipt of this registered letter, together with your registered letter. You will then have the most effective evidence to prove that you are the original inventor, and that you have disclosed your invention to me, if complications of any kind should ever arise.



10. Q. What will become of the sketch and the description after the preliminary examination has been made?

A. If your invention contains appreciable pat-

entable matter your attorney will take up the study of your sketch, and if the deficiencies are merely structural he will supply them himself upon the receipt of your order to prepare the case. If, however, the deficiencies are of such a character that he can not legally supply them himself, he will advise you what to do in accordance with the circumstances the case may present. Select the best and most competent patent attorney and place your undivided confidence in him; if you have an able man he will look after your interests and direct your affairs to the best of his skill, judgment and ability which will be to your advantage. If your invention is seriously anticipated by a prior patent, the true attorney will not advise filing an application, but will send you copies of such patents for your inspection, point out the anticipated parts or functions and perhaps point you out some means of overcoming the reference, if such be practical. But the bogus attorney will advise and guarantee a patent no matter how anticipated the machine is.

By following the instructions of the preceding pages it is hardly probable that the reader will ever have much use for an improver; but should the invention be of such a character as to render me-

chanical assistance before the filing of the application inavoidable, he should have his attorney handle the matter for him.

11. Q. My friend had a patent granted to him several years ago. He had a model made of his invention at a cost of several hundred dollars and spent about $100 in advertising his patent in newspapers, magazines and scientific journals, but he has never made a dollar out of it. What is the probable cause of his failure?

A. It is quite probable that your friend has a patent that secures to him, so to speak, the full enjoyment of a shadow that is cast by an object upon a building lot, and that by virtue of his patent he owns neither the object nor the building lot, but the shadow. How do you expect him to make money out of a shadow? There are thousands of such patents in existence; they are mere shadows of patents and therefore absolutely worthless. The reason for such a multitude of worthless patents is, either the inventors had but shadows of inventions and therefore have shadows of patents, or the inventors have shadows of patents though they have real inventions and because of their attorneys who were incapable of procuring for them

patents that would have secured to them the real things instead of shadows only. In either case these inventors have but shadows of patents, which entitle them to the full enjoyment of shadows only, and nothing more.

One who has a real invention and a real patent for it, though his invention is an absolute commercial failure, would be very likely to make some money out of it. To demonstrate this fact we will say, by way of example, that your friend had a patent for a toy revolver which to manufacture would cost about 15 cents; but as toy revolvers can not be retailed for more than 25 cents, and as the jobber must have a commission of 10 per cent., and the retailer must, on such seasonable goods, make a profit of 50 per cent., the project is a flat failure. But when your friend's patent was issued, its claims were published in the Official Gazette of the Patent Office and read by all those attorneys who were interested in your friend's invention because they have gun and ordnance manufacturers for clients. Thus, if the claims of your friend's patent covered every phase of the invention broadly, though he thinks he had but an invention in a toy revolver, these attorneys would have called

the attention of their clients to the invention; because the toy revolver operated on a new principle, and that principle may be applied to a Hotchkiss revolving cannon or a rapid firing gun, etc., of which your friend never dreamed, but which his claims could have covered nevertheless. Your friend would have probably heard from some of these manufacturers within ninety days after date of issue of his patent, and sold the toy for a snug little sum.

Such cases are of frequent occurrence. Inventions that are an absolute commercial failure in the line for which they were originally intended are often a great success in a different branch of industry of the same class. Every inventor is entitled to such claims as would secure to him the right of application of his invention to a different branch in the same class, and with all the necessary connections therefor of which he did not think at the time. When an inventor holds a good patent, with predominating claims, he will be paid for it by some person or company who may want his claims, not his invention. Often one files an application for some machine of very promising commercial possibilities, but his application is rejected on some

crude and commercially worthless toy or other insignificant machine embodying the operative principle of the invention, and because there are such claims on the crude thing that would prevent the inventor of the practical invention from making it, the rejected inventor is compelled to buy the patent for the crude article at any cost. Thus, we see that the patent is the all important. With it one is apt to make money, even if he has a commercially worthless invention, and without it he can not make anything out of his best and most promising invention. Inventors should therefore strive to procure patents of the highest order, even for the simplest and apparently the most insignificant invention.

12. Q. Why does the Patent Office grant patents for mere shadows on inventions, and shadows of patents for real inventions?

A. The reason for it is obvious, when the following facts are clearly understood: The sole object of granting patents is, as we have seen in answer to question 2, to the end of promoting science and the useful arts. This being so, the Patent Office does not look to the commercial end of inventions. Its doctrine is that every improvement

on a thing, however slight, if it is at all useful, tends to perfect that thing. Furthermore, the Patent Office is a scientific institution, and its operators are scientists, theoretical men, not practical mechanics. Thus, if an invention is so described as to appear theoretically useful, or if only not pernicious, the Patent Office must, in accordance with the laws, grant a patent therefor (see answer to question 16.) Hence, the granting of patents for slight and commercially worthless improvements, is, as far as the Patent Office is concerned, just and proper. As to the granting of shadows of patents for real inventions, we must remember that, as remarked in answer to question 61, the Patent Office is the grantor, and as such, it need not grant anything that the grantee is not asking for, or he is striving to obtain. The shadows of patents for real inventions are thus not the fault of the Patent Office, but of the inventor's attorney, who did not strive to obtain that to which his client was rightfully entitled, and thus secured but the shadow of the patent privilege his client should have enjoyed.

PART III.

How to Make Money Out *of* a Patent.

A SERIES OF PRACTICAL INSTRUCTIONS.

The following don'ts, if scrupulously heeded, will curtail the usual waste of enormous sums of money by inventors and patentees to an appreciable extent and will be productive of much better results than the methods usually employed to dispose of, or otherwise make money out of, a patent:

1. Don't let your pending application go to allowance without having some competent patent attorney inspect it to see if your attorney of record has secured to you all the claims you were entitled to. If he has not, you can demand of him to do so. He need not know that the case has been inspected by another attorney, as he will have no notice of it from the Patent Office. The cost for inspection of a pending application (which is usually about $5 if the inventor can furnish the references found at the preliminary examination) may save you the cost and trouble of a reissue patent and secure to you claims that will be worth considerable more than ten times the cost of in-

spection. Remember that if you have a patent that does not protect your invention thoroughly, you have nothing to sell.

2. Don't build a model of your invention until your patent has been officially allowed; unless your invention is an improvement on an article you manufacture, or it is of a nature that the Patent Office would require a model. Often an inventor spends several hundred dollars on experimental work, on the opinion of patentability rendered to him by his patent attorney, but when the application is filed, it is partly or wholly rejected on a prior patent, which the attorney failed to notice, or a caveat, or a pending application which could not be foreseen, so that the result is that the inventor gets but a narrow patent hardly worth its cost, and all the money he has spent on the model will be entirely lost to him; for he is not likely to realize a dollar from that patent. In interference cases a model has some little weight, but not enough to justify its cost. The prior applicant has the greater advantage. File your application as soon as possible, and when the application is officially allowed and the claims are of a nature as to secure to you an important part of the invention, then go to work

and have a perfect-working, full-size model made of your invention.

3. Don't spend a dollar for advertising your patent, for not only will advertising do you no good, but it will do you positive injury. When a manufacturer buys a patent for an improvement on the goods of his manufacture he does so to have some advantage over his competitors and he watches that acquired right with great jealousy so as to surprise his competitors with that improvement when competition has reached to an intolerable point. The fact that the patent is advertised is considered by manufacturers sufficient proof that the invention is worthless. A good patent for a desirable improvement does not require advertising to sell it, and a shadow of a patent no amount of advertising will sell. Advertising is good to sell things to the general public, but not when you have but one patent to sell. Learn just how much of a patent you have in view of the references on record. If your invention has been anticipated by prior patents to such extent as to allow you only a few narrow claims, don't spend another dollar on it—not even the last Government fee of $20—but try to dispose of the claims for whatever you can

get for them. Submit copies of the allowed claims with blue-prints to some of the manufacturers of the article of your invention. If the claims are of any value to them at all, they may be willing to pay you one or two hundred dollars for the slight improvement covered by these few narrow claims; if not, that patent will be perfectly worthless to you and no amount of advertising will sell it. Why spend more money thereon?

4. Don't make cuts or print circulars, or publish your patent in any shape or manner, unless you intend to manufacture your invention yourself. When your patent is issued and embraces claims worth the having, have a perfect-working, full-size model made of your invention. If the invention is of such a nature that a full-size working model is beyond your means to provide, have a working drawing made thereof. When your model or working drawing is completed secure the names and addresses of all the manufacturers of machines or articles of your invention. These addresses you can obtain by addressing The Boyd N. Y. Directory Co., 1317 Broadway, New York, N. Y., at a cost of a dollar or two; or you may be able to find a United States Manufacturers' Di-

rectory in some newspaper office in your city, or through some Washington attorney. You then order, through your attorney, ten copies of your patent at five cents apiece—that is all a copy of a patent costs in the Patent Office. Write a plain but neat business letter to every one of the first ten manufacturers, inquiring if they would be likely to become interested in your invention, shown and described in the copy of your patent accompanying your letter. The illustrations and descriptions of your invention in your patent, if they were properly prepared, are a thousand times better than the best circular, because they carry more weight. Name no price for your patent in your letter, but tell every manufacturer you write to that if he is in a position to take up the manufacturing and marketing of your invention you will do yourself the pleasure of submitting to him your model or working drawing of your invention for his inspection, upon the receipt of his notice. Every one of the manufacturers who will receive your letter and a copy of your patent will think that he is the first to learn of your invention. If your invention possesses commercial value the manufacturers who are interested in your invention will answer you

in a day or two, acknowledging the receipt of your letter and a copy of patent, and will state that they will consider your proposition and answer you within a few days.

During the intervening days the manufacturers will submit the copies of your patent to their respective patent attorneys to learn how much of a patent you have before they enter into negotiation with you. If you have A patent, every one of them will return the copy of your patent and tell you that he is very busy at the present and therefore not in a position to consider your proposition. He will, as a matter of business tact, thank you for bringing your invention to his notice and will close with a hearty wish of success with your invention; but if you have THE patent, the manufacturers will answer you thus: "We are at the present very busy shipping orders for the goods of our manufacture; we can hardly consider your proposition now, but as your improvement seems to possess some merit we might buy your patent; provided, however, you do not ask too much for it. You must understand, Dear Mr. So-and-so, that your invention is yet untried. It is not for you or us to say whether your invention is a good thing; the

public must decide in such matters. It will take several thousand dollars to make the special tools, etc. Then again, Dear Mr. So-and-so, a patent is of little value until it is litigated and sustained by the courts, and patent litigation is very expensive. We will be glad to inspect your model, or working drawings, and have you name us your very best spot cash price for your patent right," etc., or something of that import.

When you receive a few letters like this out of your ten letters mailed, you may be sure that you have a piece of property in your patent that is of good intrinsic value. You now know what you have and you need not hurry. Answer these letters, acknowledging receipt of same, and tell them that you or your representative will be in their neighborhood shortly, and that you or he will call upon them personally with the model or working drawing, as the case may be, and express a hope that you will come to some understanding with them. Your next step is, if the manufacturers of your invention are numerous, to order another supply of copies of your patent and send out ten more personal letters, enclosing a copy of your patent in each. When you have five or six favora-

ble answers, if you are not a thorough business man yourself, or even if you are, go to your nearest largest city, such as New York, Chicago, Philadelphia, or San Francisco, etc., and look up a good "promoter," not a "patent broker," but a *business promoter*. Show him a copy of your patent, your model or working drawings, and the letters of the manufacturers you have been corresponding with. If you have no such letters, no good promoter will listen to you at all; the correspondence with the manufacturers, previous to seeing the promoter is, therefore, of great importance. So many trashy patents are offered for sale and promotion that a real promoter will not give a patent proposition a moment's attention. To prove to him that you have the real thing you must have the letters of the manufacturers to show him that your invention possesses genuine merits, and that manufacturers want to buy your invention. This alone will secure you his attention. If patent promotion is out of his line he will give you the name and address of one who is likely to take up the promotion of your invention.

A promoter is usually a very busy man; after he has heard you he will ask you to call within

two or three hours for an answer. You must then take advantage of that time and learn all you can about your man and his integrity. You will usually be able to learn something of him from a neighboring storekeeper, drug store, bank, etc. When you call at the appointed time your promoter will advise you either to sell your invention for the best price you can get, or place it on a royalty with some large producer, or to organize a stock company on the basis of your invention. A promoter's judgment is usually reliable. You should make arrangements with him to handle the business end of your patent for you for a certain interest in the enterprise. You will then realize twice as much, if not more, than you could without the promoter. THE promoter does not ask fees in advance under any pretence. He travels on his own expense. He does not advertise for purchasers for your patent; he goes to see them personally, and he knows where to find them.

5. Don't be in a hurry to sign a contract of any kind. When you come to some understanding with your promoter he will draw up a contract and hand it to you for your signature. Take the contract from his hand and ask him to let you take it to

your hotel to read it before you sign it, which he usually will; but if he should not allow you to do so, simply don't sign it. Refuse to sign an assignment for any small interest in the patent under all circumstances. If you assign but 5 per cent. in your patent, you lose the control of it. Take that contract to some good lawyer, pay him a fee and ask him in these words to explain to you, the following points: 1. Under the terms of this contract, what do I agree to do, and what does the other party agree to do? 2. Under the terms of this contract, what is my remedy for the other party's non-fulfilment of conditions of this contract, and what is the other party's remedy for my non-fulfilment of the conditions named therein? 3. Under the terms of this contract, how many years, months or weeks have I to fulfil the conditions of this contract, and how many years, months or weeks has the other party to fulfil the conditions of this contract?

Yes, I am aware of the fact that you can read a contract as good as any business man, but unless you are really a man of parts, and have had ample experience in construing contracts, take my candid advice—throw away a five dollar bill and have

a good lawyer read your contract before you sign it; afterward will be too late. The party you enter into agreement with may be a good, honest, Christian man; but he is also a good business man, and as such, he will try to do himself all the good he can. "Himself" is a closer friend to him than you are, and a man has a moral right to secure all the advantages he can for his friend "self." A promoter knows how to write a contract. You will read and reread that contract; it will sound to you perfectly equitable and reasonable, but he is very apt to introduce one of those mischievous little pronouns, a clause, or some technical hitch that is hardly noticeable; but when the contract comes to court it may relieve him of all responsibility and tie you in fetters that will take considerable power to break. A *good* lawyer will detect a hitch if any exists, and if none exists it is well worth five dollars to you to know it.

The foregoing bits of advice are based upon my own large and varied experience in the disposition of my own patents. In the early days of my inventing career I followed the usual advice on the subject given by patent attorneys and in certain books on how to sell patents and how to make

money out of patents, etc., and spent large sums of money in advertising, models and brokers, with distressing results.

I will be pleased to receive criticism upon this volume, and further suggestions from its readers, with a view to assisting in the preparation of future editions.

END

CHRONOLOGY

OF SOME OF THE MOST IMPORTANT INVENTIONS.

B. C.

600—Maps, globes and dials were invented by Aniximander.

588—Sun dials were invented in Rome.

441—The battering ram was invented.

280—Hero of Alexandria formed a toy which exhibited some properties of steam. (A model of a type of a toy steam engine invented 150 B. C. is on exhibition in the Patent Office.)

228—Mirrors (silvering) invented by Praxiteles.

170—Paper was invented in China.

A. D.

1—Cotton cloth was manufactured at Baroche, in Guzerat.

400—Riding saddles were invented.

402—Bells were invented by Paulinus, Bishop of Nola, in Campagnia.

481—Horse-shoes were first made of iron.

500—Stirrups were invented.

587—Anchors were invented.

635—Pens were first made of quills.

674—Glass was introduced into England by Benedict, a monk.

750—Organs were invented.

887—Books in their present form were invented by Attalus, King of Pargamus.

890—Lanterns were invented by Alfred the Great.

1100—Paper made of cotton rags was invented.

1227—Gilding with gold leaf was invented.

1252—The magic lantern was invented.

1280—Spectacles were invented.

1300—Paper was made of linen.

1330—Guns were invented and used by the Moors at the siege of Algeziras, in Spain, in 1334.

1331—Gunpowder was invented by Schwartz. (Gunpowder is now known to have been used by the Chinese in A. D. 80.)

1341—A cannon was used at the battle of Algeziras.

1351—Wire was invented at Nuremberg.

1370—Muskets were used.

1380—Musical notes, as now used, were invented.

1417—Violins of the modern kind were invented.

1423—Engraving on metal was first invented.

1440—Printing was invented by Guttenberg at Mentz. (Faust claims that honor.)

1477—Watches were invented at Nuremberg.

1512—Etching on copper with aqua fortic was first invented.

1543—Blasco de Garay invented a steam engine which was exhibited before Charles V., at Barcelona. He employed a caldron of boiling water with a movable wheel on each side of the vessel.

1544—Pistols came into use.

1545—Needles were first made in England by a native of India.

1550—Knives were first made in England.

1564—Coaches were first made in England.

1568—Clocks were first made in England.

1580—The dipping needle was invented by Robert Norman.

1608—Forks were first used in England, but it is known that an Italian used a fork as early as the fifteenth century.

1617—Coining with a dye first invented and used in England.

1620—Thermometers were invented by Drebel, a Dutchman.

1621—The microscope was invented in Germany.
1634—Bombs were used by the French army.
1650—A railroad was constructed at Newcastle on Tyne.
1650—Air pumps were invented.
1655—The Marquis of Worcester invented a steam engine.
1656—Guhr, of Nuvenberg, invented an air-gun.
1670—Bayonets were invented in Bayonne (whence the name).
1681—Denis Papin invented a steam engine.
1687—A mechanical telegraph was invented in France.
1690—Art of calico printing was introduced in England.
1693—Bayonets were first brought into use at the battle of Turin.
1698—Captain Savary invented an engine for raising water.
1710—Newcome's steam and atmospheric engine was invented.
1718—Captain Savary invented an engine for dragging rivers and raising water.
1725—Stereotype printing was invented.
1729—Air-balloons invented by Gusmac, a Jesuit.

1730—Mr. Wyatt spun cotton yarn in England by machinery.

1735—Stereotype printing invented by William Gid, a goldsmith.

1736—Jonathan Hulls obtained a patent for the invention of a steamboat.

1738—The mode of spinning cotton by rollers was improved by John Wyatt and a patent was taken out therefor by Lewis Paul, his partner.

1742—The first horse-power spinning mill was erected at Birmingham.

1745—The Leyden jar was invented.

1749—The fly shuttle was in general use.

1752—The new calendar was introduced.

1752—The lightning rod was first used by Benjamin Franklin.

1756—Cotton velvets and quilting was made in England.

1757—Daniel Bernouilli proposed the employment of steam in navigation.

1760—Gautiier, Canon of Nancy, adopted and improved on Bernouilli's plan of steam navigation.

1761—Arkwright obtained the first patent for the spinning frame.

1764—James Watt perfected a steam engine in England.

1768—The stocking frame was applied by Hammond to making lace.

1772—Oliver Evans invented a steam engine, the first in America.

1774—Compte D'Auxiron projected a scheme for propelling vessels by steam.

1775—Perier, his former assistant, improved on his plan.

1775—The sewing machine was first patented in England.

1778—The first machinery to spin cotton was put in operation in France.

1778—Marquis de Jouffroy experimented with a steamboat on the Soane at Lyons.

1778—Thomas Paine proposed to Congress the application of steam to navigation.

1779—The mule jenny was invented by Hargrave; mule spinning by Crompton.

1782—Air-balloons and aerostation were invented in France.

1785—The power loom was invented by Dr. Cartwright.

1785—John Fitch was the first to make a steamboat on a reduced plan.

1786—James Rumsey invented a steamboat.

1787—Patrick Miller invented a steamboat.

1792—Eli Whitney, an American, invented the cotton gin.

1794—Sewing cotton was made by Mr. Slater at Pawtucket, R. I.

1795—Earl Stanhope invented a steamboat.

1796—Edward Thompson invented a fire ship driven by a steam engine.

1797—The first steamer on the Hudson was built by Livingston.

1802—Lifeboats were invented by Greathead.

1802—Photographs were first produced in England.

1802—Trevethick introduced the high pressure engine.

1804—Wolf's double cylinder expansion engine was constructed.

1806—Manufactories were warmed by steam.

1811—John Burns invented and patented machinery to make bobbin lace.

1814—The streets of London were lighted by gas.

1818—Mr. Holt invented a new method of preparing sewing cotton.

1825—The first passenger railroad was opened in England.

1826–Robers invented the self-acting mule spinner.

1828—The first passenger railroad in America (B. & O.)

1829—Friction matches were first used.

1830—Mr. Dyer introduced a machine for making cards.

1832—A new throstle frame was invented by R. Montgomery.

1834—Jackson patented his new and improved spindle.

1839—Envelopes for letters were first used.

1844—Elias Howe patented a complete sewing machine.

1852—Stephen R. Parkhurst invented a new cotton gin.

1874—The electric light was first invented in London, by two Russians.

1877—Phonographs were invented by T. A. Edison.

1878—Edison began his experiments in electric lighting.